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1924

Tests for Strength of Amalgam—*Ward*

Bowfin-Amia Calva—*Foote*

First English Dental Publication —*Weinberger*

Dental Education—*King*

Cooperation in Dental Office—*Carr*

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Dentist's Contributions to Health Education —*Millberry*

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THE JOURNAL
OF THE
American Dental Association

VOL. 11 JUNE, 1924 NO. 6

Original Communications

MODERN TESTS FOR THE STRENGTH OF AMALGAM

By MARCUS L. WARD, D.D.Sc., Ann Arbor, Michigan

PREVIOUS to the work of Black in 1895-6, there were only a few very crude tests which were sufficiently accurate to enable the manufacturers of amalgam to produce uniform products. Immediately after the publication of Black's work, several of the manufacturers built micrometers and dynamometers and purchased binocular microscopes, all of which were similar to or like the ones used by Black. The result was much more uniform products than had been possible before, and the general adoption of these instruments to test not only amalgam but other filling materials.

As the limit of usefulness of these instruments has been observed and as more scientific men have studied the problems involved in the testing of amalgam and other dental materials, more accurate data have become available and more scientific apparatus for testing has been developed.

Inasmuch as the full significance of some of the data which have been published has apparently not been fully comprehended, and inasmuch as some of the newer tests are herewith published for the first time, the attention of the profession is invited to the possibility of marked clinical errors if the instructions of some salesmen are accepted. For example, in the following advertisement taken from the Nebraska Dental News, the statement is made that Twentieth Century Alloy is "just as strong as steel beams or about ten tons per square inch stronger than the average alloy".

Repeated tests of a varied nature seem to indicate that this alloy will equal the same tests made on any alloy now in existence of approximately the same

composition. This comment is, therefore, not directed at the manufacturers of this product but at the salesmen who are apparently not well informed on this subject.

The advertisement which is printed in full apparently contains two mis-

Are You Using Twentieth Century Alloy?

Here are seven (7) reasons why you should.

YOU control the setting—make it rapid or slow to suit.

Not necessary to weigh or measure either alloy or mercury. GET THAT POINT.

One ounce of Twentieth Century produces a bulk of amalgam 25% greater than that produced by the same amount of low grade plastic alloy. For that reason it's more economical to use.

T. C. Alloy is so different than any other alloy, yes so entirely different that it is the only alloy we know of that can be patented.

It's chemically clean, looks like new silver. It is therefore free of all impurities.

IN TWO HOURS TIME it's stronger than low grade alloy ever gets.

FINALLY, it becomes just as strong as steel beams, or about ten tons per square inch STRONGER than the average alloy.

When used with chemically pure mercury, it's the last word in amalgam fillings.

Ask for quantity rates and terms.

SOLD IN NEBRASKA BY

DENTAL SUPPLY CO.

OMAHA, NEB. Branch, LINCOLN, NEB.

Fig. 1

statements of fact: (1) This alloy is not "just as strong as steel beams" and (2) it is not "ten tons per square inch stronger than the average alloy", if we are to accept as the "average alloy" other alloys of similar composition and made by some of the better manufacturers. Apparently the word "strength" has been used entirely too promiscuously by practically all dentists and by all manufacturers and their salesmen.

Black measured strength by testing for crushing resistance and for flow by means of a spring dynamometer with a micrometer attached, which is now considered by more skilled metallurgists not a very reliable instrument for crushing tests unless constantly checked with an Olsen machine. Until this time, results of these two tests have been practically the only measures of strength available. The word "strength" means to the metallurgist resistance to any one of the following: compression force, tensile or pulling force, torsion or twisting force,

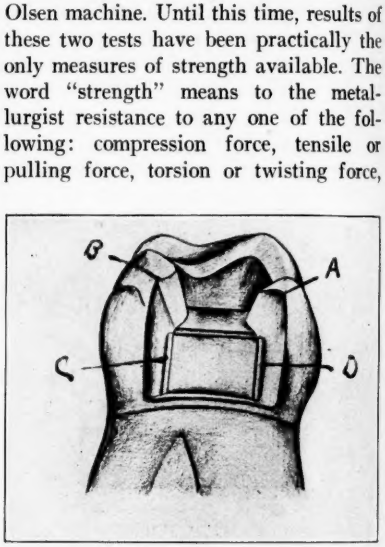


Fig. 2

force which causes fracture, force which shears, flow, and hardness. It soon becomes obvious to the one who handles metals with instruments for these tests that the presence of one property means the absence of some one or more other properties. For example, the great malleability and ductility of gold is easily demonstrated. With equal ease it may be shown that gold is not hard, flows comparatively easily, and is compressed easily but without breaking. No metal which has approximately the malleability and ductility of gold can be found which is as hard as amalgam when once hardened. The two properties do not go together in the same metal. The same is true in regard to fracture. Gold can hardly be fractured. It will bend,

compress, elongate, or flow to a marked degree before it will break.

Much the same comment may be made about platinum, copper, and some other metals and many alloys. Amalgam is generally considered as a brittle material which will break into many fragments immediately when its elastic limit is exceeded. One of the very best investigators has said that it bursts explosively when it has the well-known high-silver composition and compresses and cracks only when of the low-silver composition. On the basis of the general behavior of many metals and many alloys, one would hardly expect a high-silver amalgam, therefore, if it bursts explosively, to be at the same time highly malleable or ductile, to yield easily to torsion, or to flow easily. In other words, if it possesses a high resistance to crushing, one would hardly expect it to have a correspond-

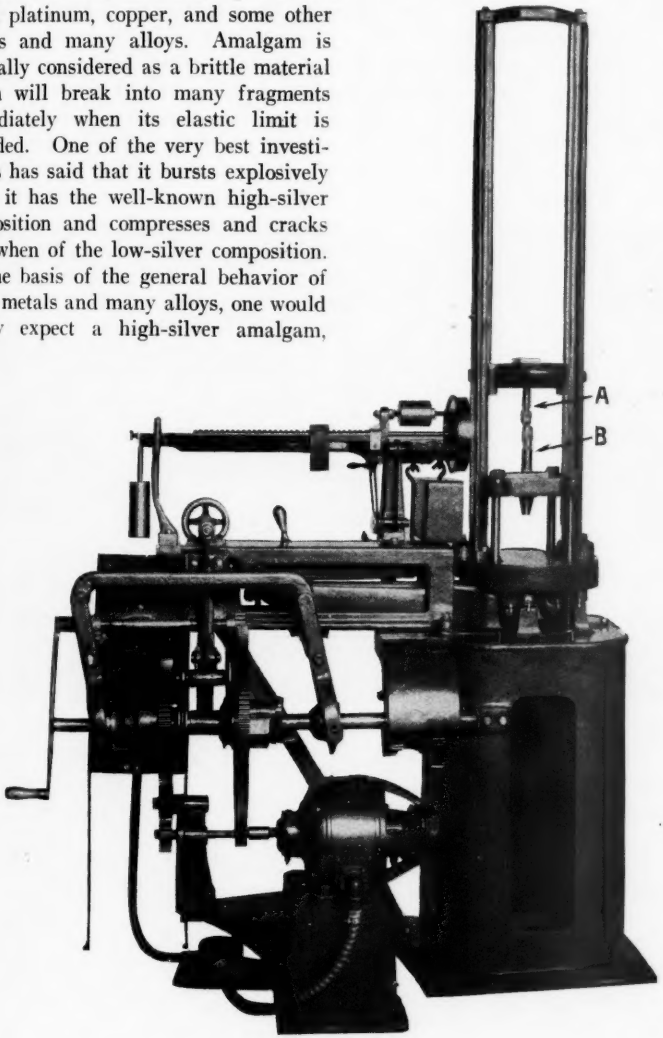


Fig. 3

ingly high resistance to other forces which might be applied. Notwithstanding this general rule for many metals and alloys, the word "strength" has been applied to amalgams and to many other dental materials apparently too promiscuously and oftentimes in such a manner as to confuse the one who uses them and lead him to believe that it was a generally strong material. I have seen many clinical evidences of this situation which led me about three years ago to start an investigation of the strength of amalgam.

One of the first studies begun concerned the crushing strength of this material. Nowhere in the literature was any reference found to the rate of applying the crushing force. Many figures were found giving the crushing point, but nothing about how rapidly the load was applied. This seemed to make the figures relating to crushing resistance of doubtful clinical value. Moreover, clinical observations seemed to indicate that these high-silver amalgams did not always burst explosively.

On the other hand, some seemed to be somewhat malleable and ductile to the detriment of the material. This was observed especially in mesioclusal and distoclusal fillings where the force of mastication was heavy, where the step portion of the filling was small and where the seating of the interproximate portion was defective. In such fillings there had apparently been undue stress applied to the portion of the filling occupying the occlusal portion of the cavity and commonly called the step, either by the filling's sliding in a proximal direction on account of a defective seating, by lack of buccal and lingual retention or by too small a step portion, or combinations of these three.

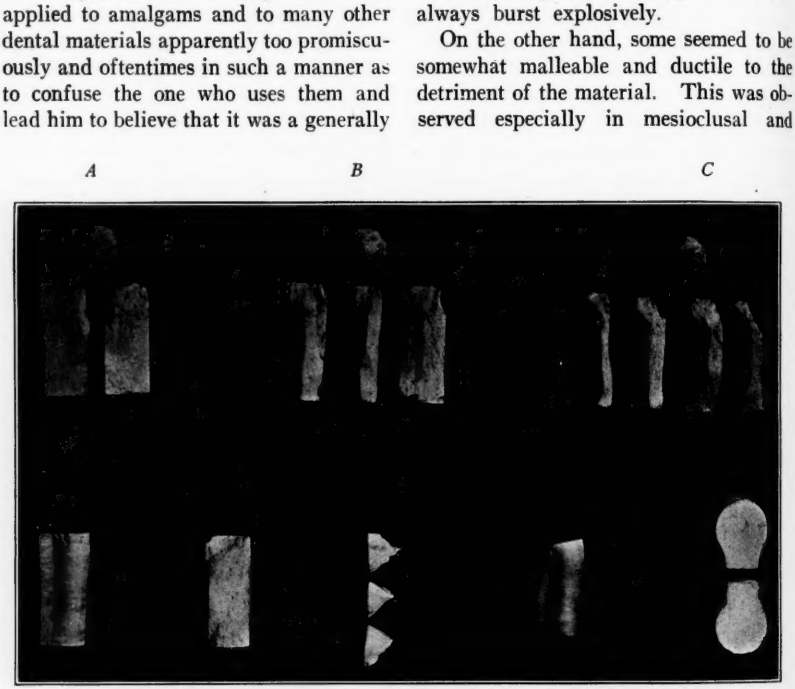


Fig. 4

The defect usually observed was in the form of a leakage at the points *A* and *B* in Fig. 2.

Observations were made to determine whether there had been insufficient extension of the cavity at these points, but in each case it appeared to be a movement of the filling in a proximal direction. In some other cases where there had been a considerable portion of the occlusal parts of the molars filled with amalgam, the edges of the fillings were seen to be forced over the margins of the cavities. This led to the conclusion that amalgam was in some degree malleable.

With these clinical observations as a basis for study, I undertook a series of tests for crushing resistance with a modified Olsen universal testing machine (Fig. 3), and applied the force at varying rates of speed, from the instantaneous application of 4000 pounds to a careful balance of the load over a period of one hour to the crushing point.

The specimens were .250[1] of an inch in diameter and .625 of an inch long and made by mixing the alloy and mercury in a wedgewood mortar for one and one-quarter minutes as rapidly as possible, then by working it in the hand for three and one-quarter minutes as rapidly as possible and then by packing by hand, using as nearly as could be determined 30 pounds pressure and allowing to stand for seventy-two hours at 72 degrees of temperature. In all cases well-known high-silver alloys were used. It has been claimed that higher pressures are possible when packing amalgam for fillings, but I have not found this generally true in practice.

The fillings which were struck with the 4000 pound load broke into fragments which apparently flew to all parts of the room. The portions of the specimen remaining were usually of every conceivable shape. Those which had the load applied to the crushing point over a period of twenty minutes and longer almost invariably broke into three, four or five parts of a very definite shape as indicated in *A*, *B*, *C* and *D* in Fig. 4.

In practically every case in which the load was applied to the crushing point over a period of twenty minutes or longer, one of these phenomena would occur. In all cases the small conical pieces were of practically the same shape and of the same size, and the columnar pieces were of practically the same size as others from the same specimen.

Measurements were taken at various times when the load was applied slowly, and it was found that the specimens had shortened and widened. This led to a study of how much load would shorten and widen a specimen. Since a 300-pound force is considered possible of execution in the molar region of some persons, one of these specimens was placed under this load and kept there for twenty-eight days. (*G*, Fig. 4). This specimen shortened .130 of an inch; widened .030 of an inch; is crooked, and has a notch in the bottom made by the tipping of the specimen as it shortened and became crooked.

Another specimen made in the same manner from the same alloy was placed under a load of 100 pounds for twenty-one days, and it shortened .010 of an inch. Repetitions of this test revealed that high silver amalgams will yield under this load apparently every time it is applied if sufficient time is allowed for the material to flow. This would seem to account for the defects observed at the points *A* and *B* in Fig. 2, and furnish reason for greater precautions in

1. On account of the necessity for dentists purchasing supplies by the avoirdupois and troy pounds, they usually more readily make use of these systems. The metric system, therefore, has not been used in this investigation.

the preparation of this type of cavities for the reception of this material.

In the cavity shown in Fig. 2, the buccal and lingual walls are furrowed almost to the occlusal surface *C* and *D*. This practice in cavity cutting is condemned by many good dentists on the ground that to furrow or groove these walls weakens them. It would seem, however, that this point of view is not always justifiable in the light of the information just given. On the other hand, it would seem that not only should this practice be followed, but there should be a definite seating which would prevent the filling from sliding toward the proximal surface whenever there is sound dentin in sufficient quantities to warrant it, and there should be a much wider and deeper step portion than is usually employed if the best results are to be obtained.

From the advertisement (Fig. 1), the conclusion may be drawn that amalgam will resist as much tensile stress as steel. If this were true, it seems that there should be no such defects as those suggested at the points *A* and *B*, in Fig. 2, for a comparatively small step portion would prevent the filling from stretching or sliding. Since no data have been available to indicate the tensile resistance of amalgam, equipment was designed to permit tests to be made. Figure 5 shows a briquette mold designed after the standard molds for forming briquettes to test Portland cement, plaster of Paris, etc.

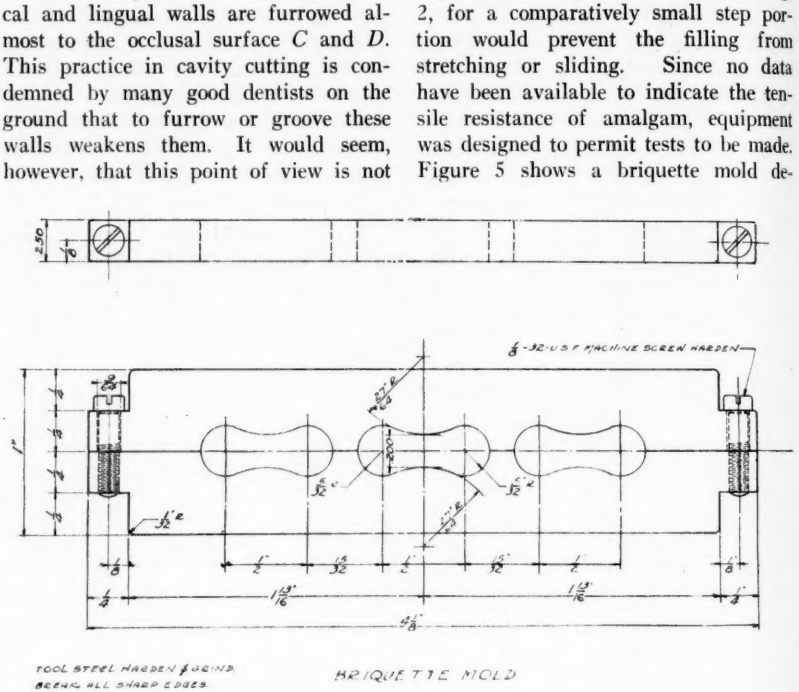


Fig. 5

Figure 6 shows one of the briquettes in the receiver for the execution of the tensile stress.

In Fig. 3, at *A* and *B*, is the receiver attached to the universal testing machine and at *H* in Fig. 4 is one of the briquettes that has been broken. One of the first observations made was that there was a great difference between the resistance to crushing and the resistance to pulling. It may be noted that the briquette mold has a cross sectional dimension in one

direction of .250 of an inch and in another, of .200 of an inch. This gives practically the same cross sectional area as the cylinders used for crushing, which were .250 of an inch in diameter. Moreover, the briquette and the cylinder each weigh approximately 154.3 grains (10 grams). This allowed the same amount of material to be mixed either for the briquette or the cylinder, thus eliminating differences in the thoroughness of mixing the alloy and mercury which usually accompany the mixing of large and small masses. Instead of finding similarity in the resistance to crushing and to pulling, it was found that there was little in common. The greatest resistance to pulling force was found to average approximately 280 pounds. Varying the rate of application of the load as had been done when testing for crushing resistance made less difference in the results, though the application of the load over a period of twenty minutes showed the tensile resistance to be higher than when it had been applied over a shorter period, while the reverse was found to be what took place when testing for crushing resistance. The break was in all cases within closer ranges and was in the form of a clean, smooth break into two parts (*H*, Fig. 4), while when testing for crushing resistance, the broken parts consisted of a conical part at one or both ends and two, three or four columnar pieces (*A*, *B*, *C* and *D*, Fig. 4), if the load had been applied over a period of twenty minutes or longer, and of many irregular pieces if the load had been applied quickly. There have been only a few exceptions to these tendencies. During these few tests when the crushing point had been reached in about a minute, the tendency to break into a cone with two or more columnar pieces was less distinct.

The very low tensile resistance of these high-silver alloys may account for the inability to obtain a greater difference in the breaking resistance with different rates of application of the load, though it seems apparent that what difference there may be has little practical significance on account of the low maximum, and must lie within much closer ranges than the maximum and minimum for crushing resistance does with different rates of application of the loads.

The average crushing resistance of the cylinders broken with the load applied over a period of from fifteen seconds to one minute was 2,465 pounds.

When the load was applied over a period of from five to fifteen minutes, the average crushing resistance was 1920 pounds.

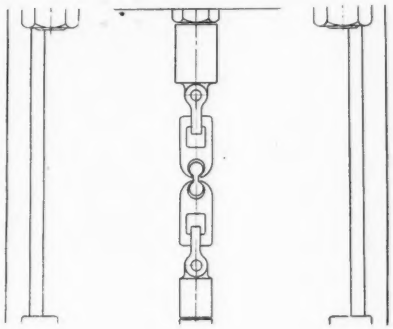


Fig. 6

When the load was applied over a period of from twenty to fifty-five minutes, the average crushing resistance was 1650 pounds.

If one hour or more was taken to apply the same load, there was a marked tendency for the cylinder not to break or crack.

When the load was fixed at 300 pounds and sustained for twenty-eight days, there was a marked distortion of the cylinder, as shown in *G*, Fig. 4.

And, finally, when the load was fixed at 100 pounds and sustained for twenty-one days, it shortened .010 of an inch.

From these data it would seem that

most, if not all, of the figures given up to this time for the crushing resistance of these alloys had been obtained by a rapid application of the load which seems to be the most favorable condition under which they could be made. Moreover, they seem to indicate that these alloys

the fillings made in practice. Analyses of the cylinders and briquettes used in this investigation showed that they contained from 51 to 53 per cent of mercury. The amount of mercury in cylinders made with 500 pounds pressure is from 40 to 41 per cent, depending on the alloy

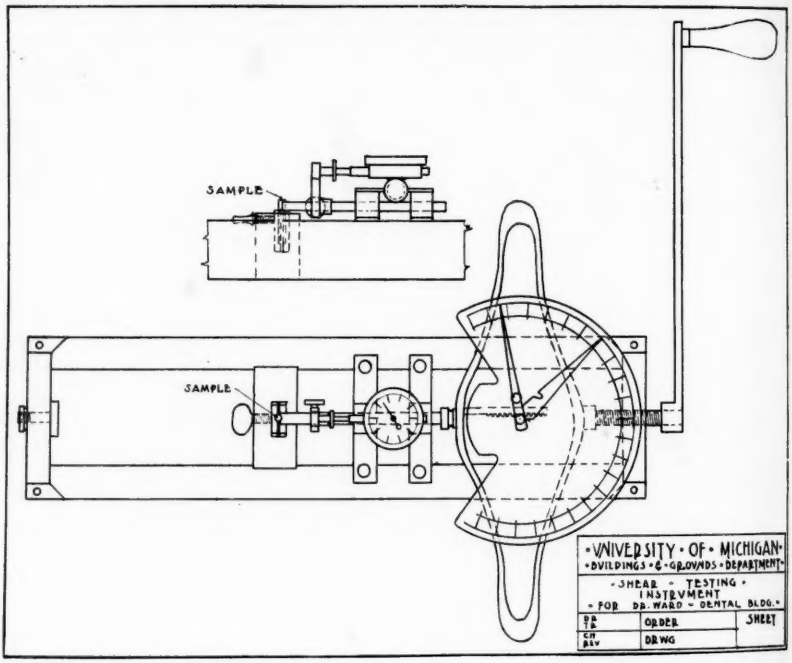


Fig. 7

really do not have a definite crushing resistance when made under the conditions which exist in practice. The principal difference between fillings made in practice and those often made in the laboratory is that there has often been much more pressure used in packing in the laboratory than is possible in practice. The laboratory fillings, therefore, when made under these conditions, are more dense and contain less mercury than

and the mixing. This seems to indicate that these high-silver alloys, instead of having definite crushing resistance, have only ranges within which they fall, depending on the alloy, the mixing, the packing, the rate of application of the load and perhaps other things.

The discovery of the great difference between the compression and tensile strengths of amalgam aroused interest in other tests used largely in engineering

to test materials for that work. I then asked the Tinius Olsen Company to construct an impact testing machine, and while this was under construction, proceeded to adapt a 1,000-pound spring dynamometer to a rigid frame (Fig. 7) so that the shearing resistance of this material could be measured.

After studying the shearing resistance and making further observations in the clinics, it was decided that probably a combined shearing and fracture test better represented what took place in such fillings as might be placed in such cavities as the one shown in Fig. 2. Instead of applying a horizontal force immediately above the fulcrum, as would be done in a shearing test, the force was applied .10 of an inch above on the assumption that this would more nearly represent the conditions met with in such fillings as the one shown in Fig. 2 when an opposing tooth caused force to be applied to the occlusoproximal margin of a filling for a cavity similar to the one shown in Fig. 2, and the seating is defective, causing the step portion to carry most of the load. The same kind of cylinders which had been used for the crushing tests were then used for a series of tests.

The average resistance to this force was 122 pounds when hand pressure for packing was used, and only 167 pounds when 500 pounds was applied when packing. This was even lower than was anticipated, so the dynamometer was checked against the Olsen machine in order that the factor of error often found in these machines might be known and accounted for; the tests were repeated at varying rates of application of the load, with irregular results. In few cases, however, have tests of this kind shown as much resistance for these amalgams as was shown for their tensile resistance, and the tensile resistance is apparently only approximately one-eighth as much as is the crushing resistance. An interesting observation was made in connec-

Fig. 8

tion with these shearing tests by setting a micrometer which worked automatically on the push bar between the specimen and the dynamometer. This showed how much one of these specimens would bend before it would break. It was found that 50 pounds applied for only twenty-four hours would bend one of these cylinders from .009 to .010 of an inch, an amount sufficient to be of marked clinical significance in connection with mesioclusal and distoclusal fillings.

When the Olsen impact machine (Fig. 8) arrived, the chuck for holding the specimens was reconstructed to carry the same kind of cylinders which had been used for the crushing and combined shearing and fracture tests. Inasmuch as this instrument does not permit varying the rate of application of the load readily, the machine was used as designed. It has a capacity of 25 foot pounds. The results of these tests all ranged from 1½ to 3 foot pounds with these alloys. This was so low that I asked for some glass rods and found that some grades of rods would offer as much resistance as the amalgam did. I then placed a piece of steel in the machine that had the temper drawn and the hammer tripped. The eye could not detect that it was even bent with the full capacity of the machine, but a careful examination in the lathe revealed that it had been slightly bent. Gold and porcelain cylinders were then constructed to determine if there was anything which dentists used for fillings which would offer as little resistance to this test as amalgam did. It was found that gold would bend but not break, while some porcelain as manipulated by dentists would actually excel in this test.

While these three new tests, tensile, shearing and fracture, and impact, together with the one which consists of varying the rate of application of the load in testing crushing resistance, will need some perfection in order to permit accurate conclusions to be drawn, it would seem that they have already demonstrated the gross error of comparing the strength of amalgam favorably with steel and have proved the fallacy of promiscuously applying the term "strength" to dental materials simply because they may have a comparatively high resistance to one kind of force.

THE BOWFIN-AMIA CALVA*: HISTOLOGY OF THE BONE AND TEETH

By J. S. FOOTE, M.D., Omaha, Nebraska

THE bowfin is one of the existing survivors of the ganoid fishes which extend backward in geological history as far as the Silurian Age. The fish is interesting on account of its prehistoric ancestry and its close relation to the line of ancestry of all the higher bony fishes. It may, therefore, be expected to show early structural types of bone and teeth and their histologic relations to each other at an early period of vertebrate history.

Sections of the vertebrae, cranial bones, mandible, fin and teeth have been made and examined microscopically, a report of which is submitted below. It has been assumed, in these comparative studies, that the early type of bone is accompanied by an early type of teeth, and it is for this reason that studies of the teeth have included studies of bone.

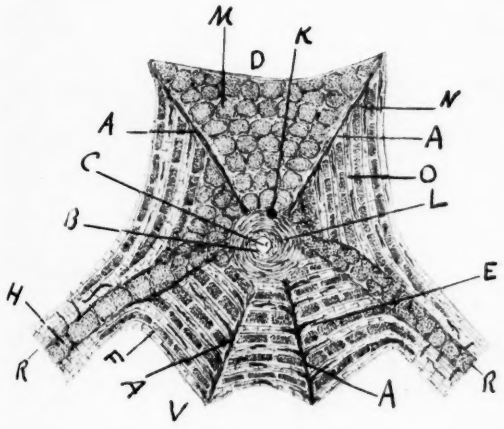


Fig. 1.—Cross section of a dorsal vertebrae through the proximal portion of two ribs. The body of the vertebrae is irregularly hexagonal in shape, the ventral half, *V*, having three concave surfaces between the ribs; the dorsal, *D*, having one, and each one of the lateral halves, one. The body is, therefore, divided into six irregularly shaped, triangular compartments by narrow partitions of bone carrying blood vessels and extending from the center to the angles of the ventral and dorsal surfaces, *A*. In the center is a very small canal, *C*, surrounded by a clear, nucleated ring of bone substance, *B*, which, in turn, is surrounded by a dense plexus of blood capillaries, *L*, from which vessels are sent off through the radial bony partitions, *N*; on their way from the center to the surface angles, these vessels send off branches into the alternating layers of bone, *F*. The triangular portions of the body are composed of concave alternating layers of bone and vascular channels in the ventral and lateral portions *F* and *O*, and of globular, granular masses in the dorsal and inner portions of the lateral divisions *M* and *D*. The proximal portions of the ribs are composed of central, narrow-like vascular

*Work done under grant by the Research Commission of the American Dental Association.

masses enclosed within walls of bone which contain blood vessels *H*. In the outer portion of the central capillary plexus is a cross section of a blood vessel *K*, extending parallel with the vertebrae. The bone substance of the section is extremely early in type since it contains few cells and these are multipolar, resembling nerve cells.

The section shows several interesting features: the alternating narrow layers of bone and vascular channels in the ventral half and the vascular granular masses in the dorsal half; and the extensive circulatory system coming up from the center and throwing off radials and laterals which produce bone and lay it out according to the architecture of the circulatory system. By developmental pressure, the vascular channels diminish in width as the bone increases, and we catch a glimpse of lamellae in the process of formation.

The dorsal half of the vertebrae is earlier in the degree of differentiation than the ventral since it has less bone and more vascular channels. The intimate connection of the central vascular channel of the ribs with the alternating similar channels of the vertebrae makes the rib a part of the vertebra and both important parts of the vascular system. The early character of the multipolar bone cells in their relation to the branching type of connective-tissue cells is suggestive of the common origin of tissue varieties. The vascular character of the vertebrae suggests a physiologic rather than a mechanical importance to bone.

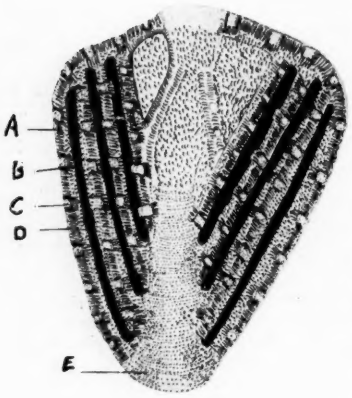


Fig. 2.—The floor of the mouth as seen within the mandible (about natural size). There are four toothed bony rays, *A*, on either side of a bony toothed tongue, *E*, all converging from the posterior portion of the mouth to the anterior, lateral portion of the tongue, forming a bluntly triangular body which presents a formidable surface of teeth. Each ray has a center of vascular bone of very early differentiation, with gills along its inferior and bony buds of small teeth, *C*, along its superior surface. The rays are separated by spaces, *B*, freely admitting the passage of water over the gills. The teeth are small, pointed cones curving backward. The tooth buds alternate on the two sides of the rays. The tongue-like body, *E*, is composed of very vascular bone covered by a sharp-toothed surface. There was no evidence of shedding of the teeth.

The mandible is a vascular bone with a large, central canal having large, curved, pointed teeth along its free margin, none of which show signs of shedding. They are firmly ankylosed to the jaw. The bone of the jaw is composed of undifferentiated bone substance and multipolar cells resembling some branching connective cells or multipolar nerve cells.

The superior maxilla has a bone structure of the same early differentiation. It has two rows of pointed, curved teeth of varying sizes along its free border, and behind them five separate groups of small, curved teeth, sixteen in each group, all firmly set in the bone. The roof of the mouth is thickly set with very small teeth.

The whole mouth presents a formidable display of prehensible powers by such an array of organs called teeth and this gives significance to the first and perhaps the most important function of teeth in vertebrate history—prehension. The change from prehension alone to mastication alone produced a very important change in the mechanical character of the later teeth as we find them in man, since the transformation of the primary function of an organ to a secondary may be followed by a pronounced disturbance of a physiologic nature which reduces the functional value of that organ to a pathologic degree.

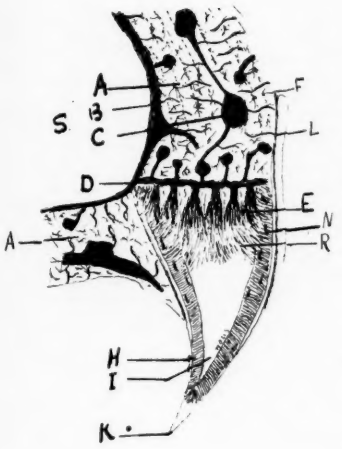


Fig. 3.—Anteroposterior section of the central portion of the superior maxilla with tooth in position. *A, A,* cross section of a portion of the cranial bone enclosing a large space or cavity represented at *S*. The bone is perforated by numerous vascular canals extending transversely as at *C*; it is composed of clear bone substance dimly marked off in coarse lamellae which are occupied by rather infrequent multipolar bone cells *F,* and crossed by canaliculi *L*. The bone is very early in type of differentiation. *D,* group of branching blood vessels at the base of the tooth which are enclosed in bone; *E,* brush-like extensions and expansions of these vessels into fine radiations *R,* which become the dentin tubules at *H*; *I,* a very wide pulp chamber enclosed by a narrow dentinal wall *H*; *K,* homogeneous tip. The section is interesting on account of the vascular early type bone and the relation of the dentin of the tooth to the circulatory system and the enclosing bone, which apparently merge into the tooth.

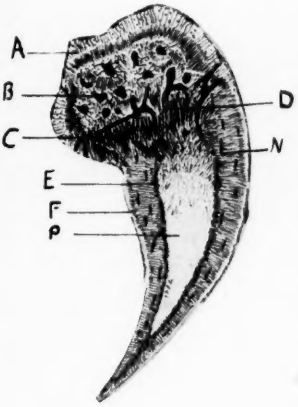


Fig. 4.—Longitudinal section of an upper middle front tooth and the portion of bone from which it sprang. *A,* multipolar cell and channelled bone also very early in type of differentiation, the channelled bone substance being produced by cells (possibly endothelial) within the circulation and the bone substance of the multipolar cell bone by cells external to the circulatory vessels; *B,* vascular canals extending transversely in the bone; *C,* group of blood vessels in the bone at the base of the tooth sending off fine, vascular radiations which, with the fine, intervening bone radiations, merge into the dentin of the tooth *D*; *E,* nucleated dentin; *F,* homogeneous border; *P,* pulp chamber. In a study of this section no line of demarcation between the bone and tooth was determined, but the former seemed to merge into the latter. Large, prominent nuclei were seen in the lower portion of the dentin which were in direct connection with the dentin tubules as at *N*. The nuclei do not represent the multipolar type of bone cell seen in the bone from which the tooth was derived, but a later type of bone cell seen in the bone structure of later bone differentiations. During the process of grinding these combined sections of bone and teeth, a subjective sense of increasing hardness is experienced at the junction of the bone and the tooth. While the difference in inorganic percentage of bone and dentin is recognizable, the exact location of the site of transformation is beyond microscopic vision. If bone substance is 67 per cent and dentinal substance is 72 per cent inorganic, the one could not be told from the other by the sense of vision. In both there is a chemical combination of an organic base with inorganic salts of such a character that they may be separated by heat or acids, but not by a sense of vision. If we could have dentinal substance alone and bone substance alone, a comparison would be altogether chemical and not histologic. Such an intimate relationship suggests a common origin.

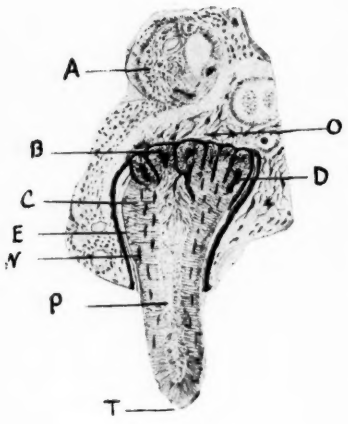


Fig. 5.—Longitudinal section of a small tooth in the upper jaw and the bone of its setting. These small teeth were situated posterior to the larger teeth described above. *A*, bone of the same multipolar cell type as described above; *O*, small areas of channelled bone; *B*, bone at the base of the tooth merging into dentin; *C*, dentin; *E*, border of the tooth; *N*, nuclei of the dentin; *D*, vascular canals and circulatory system around the base of the tooth; *P*, pulp chamber; *T*, homogeneous cap. The bone of the jaw, *A*, has a lower degree of differentiation than the bone of the base of the tooth and also a lower degree of hardness. The cells of the jaw bone are the early multipolar cells, *O*, while those of the base of the tooth are the long narrow cells, *N*, of later bone differentiation and found to be extended into the dentinal walls where they communicate with the dentinal tubules as they do in bone by the canaliculi, making an osseous dentin. The external homogeneous border, *E*, takes its origin around the base of the tooth as a bone product and gradually becomes thinner as it extends along the dentinal wall, where it is reduced to a thin envelope until it reaches the tip, where it expands into the homogeneous cap, *T*. It has the appearance of an enclosing capsule.

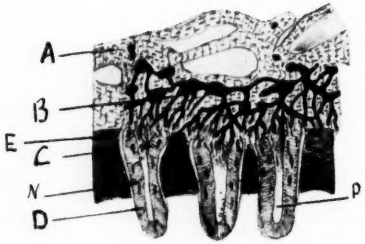


Fig. 6.—Three small teeth and their setting of a central group in the upper jaw. *A*, bone of the jaw, showing the early multipolar cell differentiation; *B*, circulatory system and bone at the base of the teeth merging into dentin; *C*, horn-like layer covering the bone; *D*, dentin or osseous dentin; *N*, nuclei; *E*, border.

This section is cut through the centers of the teeth and shows the enclosing border, dentinal wall, pulp chamber and the extensive circulatory plexus in the bone at the base of the teeth. It presents the same interesting features as the section shown in Fig. 5.

The early type of bone differentiation of the jawbone, *A*, indicated by the clear bone substance and multipolar cells, compared with the later bone differentiation indicated by the long narrow lacunae, with their enclosed bone cells, *N*, and the gradual transformation of the former to the latter, together with the increased density which accompanies the change, suggests the possibility of the increased calcium percentage in the osseous dentin to meet the requirements of the new and different objective, prehension. The extensive circulatory system in the bone under the teeth indicates the site of great metabolic activity and the part which the vascular system has in the adaptation of a general bone differentiation to a special. The homogeneous border, *E*, is also seen as an enclosing capsule with very little in the form of a cap. The cells occupying the lacunae of the dentinal walls, *N*, shown in the sections of Figs. 3, 4, 5, 6, 7, 8, 9 and 11, do not have the location or shape of odontoblasts which, in later teeth, belong to the pulp chamber. Their long axes are parallel with the long axes of the teeth and most numerous in the basic portion of the teeth. They resemble osteoblasts in shape, arrangement and situation rather than odontoblasts, and may be supposed to produce an osteodentin, if anything.

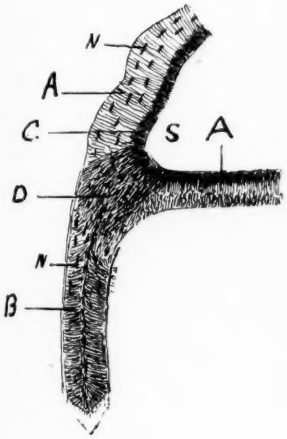


Fig. 7.—Section of a single upper tooth showing its relation to bone. *A*, *A*, bone of the jaw with long narrow lacunae and long straight canaliculi; the bone differentiation is in advance of that seen in the foregoing sections; *B*, dentin of the tooth; *C*, nuclei of the bone; *N*, nuclei of the bone and dentin; *D*, junction of the bone and dentin. The bone *A*, *A*, forms the walls of a large cavity in the cranial bone, indicated by *S*. In this section the tooth is seen arising from the junction of the two bony walls of the cavity *S*. Along the interior borders of these walls is a dense arrangement of nuclei and coarse canaliculi, *C*; the canaliculi extends across the thickness of the wall of bone passing through the long, narrow bone lacunae on their way. At the junction of the two walls, *D*, the nuclei increase, the canaliculi change their direction, and, as we follow them, the canaliculi apparently become the dentinal tubules and the bone nuclei are arranged in the dentinal walls about as they would be in bone. The section is interesting in that it shows the close relation of bone to dentin in the earliest forms of vertebrates.

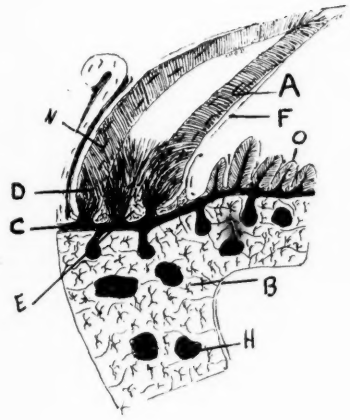


Fig. 8.—Section of the lower jaw with tooth in position. *A*, dentin of the tooth; *B*, jawbone of the early differentiation; *C*, vascular canal at the base of the tooth; *D*, bush-like vascular extensions into the base of the tooth; *E*, bone between the extensions; *F*, structureless border; H, vascular canals of the jawbone; *N*, nuclei of the dentin. This section shows one of the larger teeth of the middle, front region of the lower jaw and its setting in bone. The jawbone is very vascular, as may be seen by the numerous vascular canals as at *H* and *C*. The bone is composed of a clear bone substance crossed by long canaliculi and containing the early multipolar cells of primitive bone. Such bone has little or no resemblance to the bone of the later vertebrates. Just underneath the tooth is a prominent vascular canal *C*, which, with its many extensions, assumes the form of a vascular plexus. It throws off many bush-like vascular extensions which enter the site of the tooth. Between the extensions are small areas of bone, *E*. The fine vascular radiations, with their intervening radiations of inorganic substance, advance by the developmental force within the circulatory system, carrying with them cells which have the power of producing an inorganic instead of an organic substance and become the dentinal tubules and intervening inorganic substance of the tooth. The cells are enclosed within the dentinal wall in lacunae which communicate with each other and with the circulatory system of the pulp chamber by the large canaliculi called dentinal tubules. The lacunae of the dentinal walls are much more numerous in the basal portion of the tooth and diminish in frequency toward the upper portion, where

they finally disappear. The lacunae are bone lacunae and by their peculiar shape and arrangement suggest osteoblasts and not odontoblasts. The structureless border, ***F,*** arises in the bone around the base of the tooth and follows the advancing dentin until it is a mere envelope and then very gradually expands into the cap of the tip of the tooth. The pulp chamber is relative large and is occupied, as the tooth formation progresses, by the vascular system and its supporting tissue. The order of change in the production of the tooth of this early vertebrate may be stated as follows: (1) bone; (2) specialized and localized circulatory plexus; (3) centrifugal radiations of vascular and inorganic extensions from the plexus, and (4) vascular extensions, which become the dentinal tubules, and inorganic extensions which become the osteodentin of the tooth.

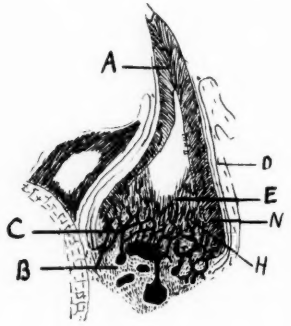


Fig. 9.—Section of a single tooth of the lower jaw showing its setting in the bone. *A*, dentin of the tooth; *B*, portion of the jawbone; *C*, plexus of blood vessels in the bone at the base of the tooth; *D*, structureless border; *E*, wide pulp chamber; *N*, lacuna of the dentin. The bone of the jaw is very vascular and shows the early type of differentiation as was seen in other sections. Underneath the tooth is a dense plexus of blood vessels, *C*, enclosed in bone; from this plexus fine, vascular and inorganic radiations extend upward where they become the dentinal tubules and substance. The cells coming up from the plexus are enclosed in the lacunae in the dentin *N*. Minute interglobular spaces were seen just under the outer border. The circulatory system of the dentin is very close to the general circulatory system, the dentinal tubules being extensions from the vascular plexus *C*. The border takes its rise, as in other sections, around the base of the tooth in the bone underneath the plexus.

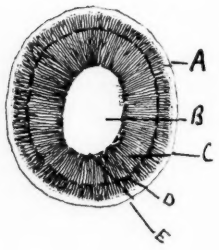


Fig. 10.—Cross section of an upper tooth. *A*, structureless border; *B*, pulp chamber; *C*, dentin; *D*, outer concentric row of nuclei; *E*, inner concentric row of nuclei. The cross section shows some interesting features: A spray of bone, dentin or osteodentin producing cells arising from the bone substance and circulatory system of the jaw (Fig. 9, *H*,) separates into two diverging columns, outer, *D* and inner, *E*, arranged in the osteodentin of the tooth as shown in Fig. 10. The two concentric rows of lacunae or cell spaces, *D* and *E*, are connected by long, large canaliculi or dentinal tubules, *C*. The inner lacunae, *E*, are situated in the osteodentin just outside of the pulp chamber and are long and irregular in width; they communicate with the pulp chamber by short tubules which, after passing through the lacunae, extend across the field of osteodentin into the outer row which is also composed of irregular spaces and situated a short distance within the external border *A*. After passing through this outer row, the tubules, often thicker than elsewhere, terminate in branches which communicate with very small, irregularly shaped spaces reminding one of very minute interglobular spaces. By this structure and arrangement the circulatory system of the tooth of this early vertebrate is very extensive and admits of an inorganic metabolism of great activity, which is housed by the pulp chamber.

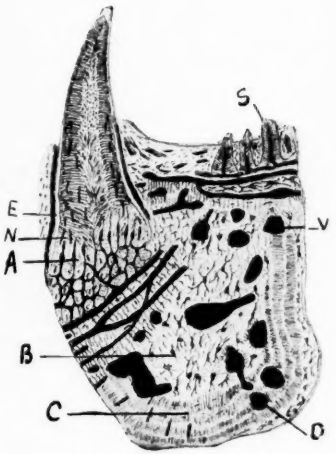


Fig. 11.—Section of the lower jaw with tooth in position, showing its relation to bone. *A*, area of blood vessels and bone merging into the osteodentin of the tooth; *N*, lacunae and their cells arising from bone cells and becoming the cell spaces and cells of the osteodentin; *B*, multipolar bone substance of the jawbone; *C*, channelled bone; *D*, vascular canals in the bone; *E*, external border arising from the bone at the base of the tooth; *V*, vascular canals; *S*, small teeth. This section is highly interesting on account of the apparently close relation of the tooth to the bone of the jaw. In the various sections of the bowfin in which both bone and teeth have appeared, the possible origin of tooth from bone has been suggested so frequently that it has become almost a conviction. In this section there is further evidence of it. There is an extensive plexus of blood vessels under the tooth, and in its meshes is a bone substance of early differentiation. From this plexus, small vessels are sent off into the base of the tooth which is nearly enclosed by the external border of the tooth, *E*. There is no visible line of demarcation between the bone of the jaw and the tooth, but the former seems to become the latter by the bone canaliculi becoming the dentinal tubules, and bone cells becoming the dentinal cells and the bone substance, the dentinal substance by virtue of a transforming power residing in the biologic demand for a new tissue to meet the requirements of an advancing level. The bone from which the tooth is apparently derived is very early in the type of differentiation and, perhaps, the last to be thought of in tooth formation; but this animal belongs to the very early vertebrates and, in the interest of self-preservation, the operation of a biologic law toward the fitness of survival was essential and introduced prehension as a means toward that end. There was no adequate tissue, exclusive of bone, which promised success, and even if this were available, it required additional strength in order to serve the purpose of a new and different office. In the interest of survival of the early vertebrates, prehension was a necessity; in the interest of prehension, special organs called teeth were necessities, and in the interest of special organs or teeth, a special act of metabolism under the direction of a biologic impulse was a necessity. There had not been established in the early vertebrate an inorganic substance of greater density than the early differentiation of bone, and if Nature intended this for the special purpose of prehension, it would be necessary to increase its inorganic percentage, and this was done by a biologic transformation of a bone cell to a cell of higher organization, called, for convenience, a dentinal cell, and a transformation of bone substance to osteodentinal substance. In this section may be seen the early multipolar cell bone at *B* and the later differentiation at *A* and *N*, which is indicated by the change in the cell from multipolar to the long, narrow cell of later bone and the change in the density of the bone substance at *B* to a higher degree of density at *N* and recognized by the subjective feeling of increased hardness during the process of grinding. As the bone of the vertebrate, and especially of the early vertebrate, is very vascular, metabolic changes are active and structural variations are numerous.

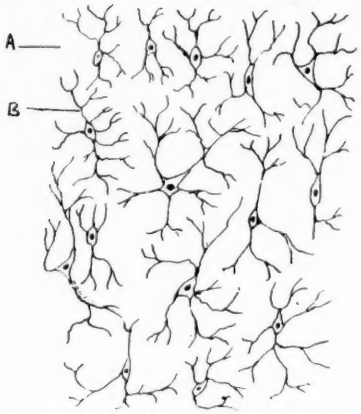


Fig. 12.—Tangential section of a portion of the lower jaw showing the clear bone substance *A* and multipolar cell *B*. The cells are very thickly set and communicate with the blood vessels of the vascular canals by means of their branches.

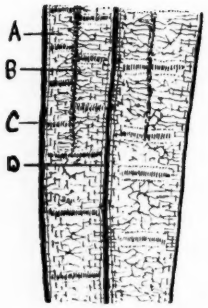


Fig. 13.—Longitudinal section of two rays of the pectoral fin. *A*, early type of bone showing the outward spread of the ray at *B*; *C*, reed-like cross divisions of the ray; *D*, circulatory vessel. The object of making a section of the fin is to determine its tissue connection and degree of histologic differentiation. A physical division of labor might be expected to show a histologic division of differentiation. The fin is a specialized organ of locomotion, a part of the osseous system, and some variation in histologic structure which would adapt it to a different purpose than that required of the general skeleton might, in the nature of things, be expected. There is, however, no difference in structure. The rays have the same early multipolar bone cell structure; but their purpose is indicated by their fan-shaped arrangement. As the rays leave their narrow, hinge-like attachment to the body, they split as at *B*, and the parts diverge to form the outer wide portion of the fin.

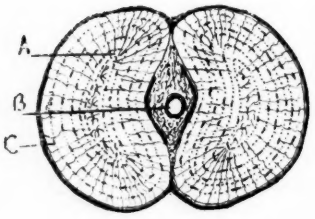


Fig. 14.—Cross section of two rays of the pectoral fin showing a slight indication of differentiation. *A*, early bone type; *B*, circulatory vessel between the rays; *C*, indication of the bone substance marked off in lamellae. By this plan of arrangement the strength of the organ is increased. The rays are held together by a supporting tissue which carries a blood vessel of considerable size, *B*. The fin is very vascular.

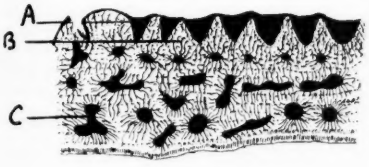


Fig. 15.—Cross section of the frontal cranial bone, showing skin-like arrangement. *A*, outer covering or skin; *B*, underlying papillary bone; *C*, vascular canals. This section is interesting in its resemblance to a cross section of the skin. The outer covering, *A*, is thin and fits over the bone, which has an upper papillary arrangement like the dermis, *B*. The bone has the early type of differentiation with numerous vascular canals extending anteroposteriorly; from these many small canaliculi come off and traverse the bone substance, dimly marked in parallel lines.

Summary

The outstanding features of this examination of the bowfin may be enumerated as follows:

1. The vascular osseous character of the entire mouth thickly set with teeth of various sizes apparently arising from bony attachments.
2. The absence of any evidence of shedding of the teeth or the formation of new teeth from any portion of the mouth.
3. The early vascular multipolar cell bone of the whole skeleton.
4. The apparent origin of more or less bone-like teeth of a later differentiation from the primitive type of differentiation.
5. The localization of long, narrow lacunae containing cells of the same shape, in the dentinal walls, instead of odontoblastic cells in the pulp chamber.
6. The apparent origin of the external borders of the teeth from bone at the bases of the teeth, and their clear, structureless character which bears no resemblance to enamel or the cementum of later teeth.
7. The dense plexus of blood vessels in the bone under the teeth, sending off spray-like extensions of fine vessels, accompanied by long, narrow cells, into the teeth.
8. The origin of dentinal tubules from the canaliculi of bone.
9. The relatively wide pulp chambers and dentinal tubules.
10. The vascular condition of the dentin or osteodentin dependent on the size of the tubules and their passage through two parallel rows of dentinal lacunae and their communication by means of minute interglobular spaces situated under the external borders.

The most interesting and perhaps the most important of the features mentioned above is the apparent origin of tooth from bone or, as it may be stated more precisely, the apparent origin of both from the circulatory system: the circulatory system, first; the formation of bone, second, and the formation of the tooth, third. The steps of the process may be briefly indicated as follows: the localization of the blood plexus in a definite area of the early type jawbone; the spraying off of fine vascular extensions and cells from the plexus; the change from the early type of bone to a later, indicated by an observed change in the shape of the cell from multipolar to the long and narrow cell of later bone, the vascular extensions of the plexus becoming the dentinal tubules; the arrangement of the new bone-like cells in parallel rows at the base of the tooth; the production, by these cells, of an inorganic substance of higher inorganic percentage than that of bone substance, called osteodentin for convenience, and the growing away of the newly formed organ from the vascular plexus as a tree from its roots,—this seems to be the crude picture of origin of the bone and tooth in the early type of vertebrates.

THE FIRST ENGLISH DENTAL PUBLICATION

By B. W. WEINBERGER, D.D.S., New York, New York

IT IS my privilege to present to the dental profession the contents of the first known dental work in the English language, published by Charles C. Allen in 1687. I say present to the dental profession, for, so far as is known, this rare work has until now escaped the eyes of all dental historians. The only reason known for this must be that heretofore no copy was to be found in any of the dental or medical libraries, and it was merely by chance that I was able to purchase this specimen.*

Anatole France, in one of his charming stories, once wrote, "There is no reading more easy, more fascinating and more delightful than that of a catalogue, (referring to books). The true book-lover is usually loath to destroy an old catalogue, and he examines every new one with the greatest care and expectation. Every now and then one of those rare and interesting occasions presents itself to a collector when he suddenly finds himself glancing on an item he has no idea of seeing because of its rarity, although he is always looking and hoping for the unexpected, suddenly to feel a cold chill run down his spine, and with a startled awakening exclaim, 'No that cannot be possible.'"

Early in the spring, after reading some forty interesting pages of old works on botany, my eyes all at once fell upon the following: *Allen, C. C. Curious Observations in that Difficult Part of Chirurgery Relating to the Teeth.* At least here was an opportunity finally to find a copy of the first work on dentistry in English. I did not dream of ever possessing this work, but within ten minutes, a cable was off to England stating, "Hold copy of Allen until letter arrives." Days passed and many anxious moments, for there was that constant fear that someone else had also seen this same item and "beaten me to it." Three weeks later the long-looked-for answer arrived, informing me, to my surprise and delight, that this copy was on its way. A day or two later the book itself was delivered. The copy was mine, and I examined it with renewed interest. In order to clear up facts so far erroneously stated and to give the readers an opportunity of acquainting themselves with this interesting work, I am offering the contents.

It is the desire to come into personal

*During my visit last summer to the British Museum, I asked for the work of Charles Allen, and as it was not catalogued, the librarian was unable to find the copy, stating that he doubted whether they had it, and it is for that reason that I presumed this was the only known copy. Recently I have received word from them that they finally located this work, "the press-mark 782.1.5 (1), British Museum, which judging from the stamp of one of the leaves, must have been in the possession of that Library considerably over one hundred years. However, it had apparently not been entered under the name of Charles Allen in the British Museum Catalogue, until comparatively recently . . . . it was apparently first entered in one of the accession catalogues."

My copy was obtained from Quaritch, of London, who purchased it as part of the library of the late Earl of Pembroke, in March, 1920.

possession of the intellectual heritage of a profession that brings together groups of men, learned, less learned and unlearned, who constitute the personnel of dentistry. The heritage is transmitted to us by the teachings of the learned and by the treasures of art and literature preserved in museums and libraries. We enter into possession of it by receiving these teachings and by coming under the influence of the ideas handed down by whatever means from those who have gone before. To what we thus receive, we add by our own experiences and observations. A library exists for the purpose of preserving, disseminating and increasing the knowledge of a profession. We are dependent on what we receive from others older; our own life, unaided by others, would discover but little.

All courses of study have an historical background. Things were not always as they are, and what they now are is the result of thoughts and acts of many generations of thinkers and doers. The profession is familiar with the history of dentistry and recognizes that dentistry is simply that which is accepted today as true; for it may, tomorrow, if more knowledge is forthcoming, be greatly modified, as has repeatedly happened. Therefore, let us break away from the present and see what the first English dental book, written 236 years ago, has to offer.

History of the Book

It is a surprising and indeed a curious fact that none of the forty dental histories so far published, including Guerini, mentions this work. The same might also be said of the dental bibliographies. Though Carabelli,[1] in his excellent historical survey of dental history (1844), fails to say anything of this book, in his bibliography, page 159, he records it as follows: *Curious observations on that part of chirurgery relating to the teeth, 4° London.* The same is true of Linderer,[2] for in his history (1851) he also neglects to mention this work but records it on page 442, as did Carabelli. Besides Linderer, the only other bibliographies that contain this item are Coles,[3] Crowley,[4] Sternfeld,[5] Port[6] and Greve.[7] Coles[8] in 1883 neglects to mention the book, but on page 6 of his list of works on dentistry, he heads the English section: *No Name, Curious Observations on that part of Chirurgery relating to the Teeth, London.* Crowley,[4] on page 10, in 1885 strangely gives Allen credit for the work: *No. 1509, Operator for the Teeth, Dublyn, 1687;* and the second item in the English section, *No. 1510, Curious observations on that part of chirurgery relating to the teeth, London, 1687,* he credits, on page 180, to an anonymous author. Sternfeld, in 1891, happened to give the author's name correctly, but the title and relative position of the two works incorrectly. He states that he obtained this information from Crowley, but failed to note that No. 1510 was by an anonymous

1. Carabelli, G.: Systemat. Handbuch d. Zahnheilkunde. Wien, 1844.

2. Linderer, Jos.: Die Zahnheilkunde nach ihrem neusten Standpunkte. Erlangen, 1851.

3. Coles, J. Oakley: A List of Works on Dentistry Published 1538-1582, With a Catalogue of Periodical Literature Relating to the Profession, 1839-1882, London, 1883.

4. Crowley, C. George: Dental Bibliography, etc., 1536-1883, Philadelphia, 1885.

5. Sternfeld, Alfred, and Kellner, Karl: Zahnärtzliche Bücherkunde, Karlsruhe, 1891.

6. Port, G.: Index der deutschen Zahnärtlichen literature und Zahnärztlichen literature und Zahnärztliche bibliographie, Heidelberg, 1903.

7. Greve, H. Chr.: Die Zahnärztlichen Literature vom ihren Beginn bis zum Zahre 1845. Weisbaden, 1918.

8. Coles, J. Oakley: An Address on Dental Literature, etc., 1882.

author, as all other bibliographers have so far done. In fact, it appears that all who so far have compiled their bibliographies copied them from Carabelli and later Crowley. The errors in the name, title or place of publication have never been corrected.

The correct title is *Curious Observations in* (and not on) *That Difficult* (which fails to appear in any of the other titles) *Part of Chirurgery Relating to the Teeth, Shewing How to Preserve the Teeth and Gums from all accidents they are subject to,* 1867, written in Dublyn and published in London. (See illustration on p. 509.)

A little later, proof will be given that this was the first work on dentistry published in England and not the second, as heretofore credited. It seems odd that none of the other early English authors who followed Allen, such as Hurlock,[9] Berdmore,[10] Ruspini,[11] Blake,[12] Hunter[13] and Fox,[14] mentions the first dental work in English or refers to Allen. Even in those days this work must have been extremely rare. Ashley Densham,[15] in his remarkable review of the progress of dental science, the best of the recent English historical dissertations, as well as all medical historians, has overlooked this important work.

9. Hurlock, Jos.: A Practical Treatise Upon Dentition, etc., London, 1742.

10. Berdmore, Th.: A Treatise on the Disorders and Deformities of the Teeth and Gums, London, 1768.

11. Ruspini, B.: A Treatise on the Teeth, etc., London, 1768.

12. Blake, Rob.: An Essay on the Structure and Formation of the Teeth, etc. Dublin, 1801.

13. Hunter, J.: The Natural History of the Human Teeth, etc., London, 1771.

14. Fox, J.: The Natural History of the Human Teeth, etc., London, 1803.

15. Densham, Ashley: A Review of the Progress of Dental Science and Literature from the Earliest Ages, Proc. Roy. Soc. Med., 1909.

Early Dental Works

So far as we know, the first work pertaining to the study and care of the teeth was a small, forty-four page treatise by an anonymous writer. This was published in Germany in 1530 by Michael Blum. Whoever the anonymous author happened to be, he confined himself in the old dental books to abstracts from strictly standard writers of the *previous* age. The work belonged to a class of medical publications of that period and later, of which a few specimens survive, and was devoted to matters of health and toilet. It had undoubtedly little standing in the profession, being written for lay readers, but it introduces to us the teachers and teachings of the dental art to laymen of nearly 400 years ago. How popular this work must have been can readily be judged, for we find nine editions published within forty-five years. These varied very little from each other in text, though differing in titles: *Artzney Buchlein, Zene Artzney* and *Zeen Artznei.*

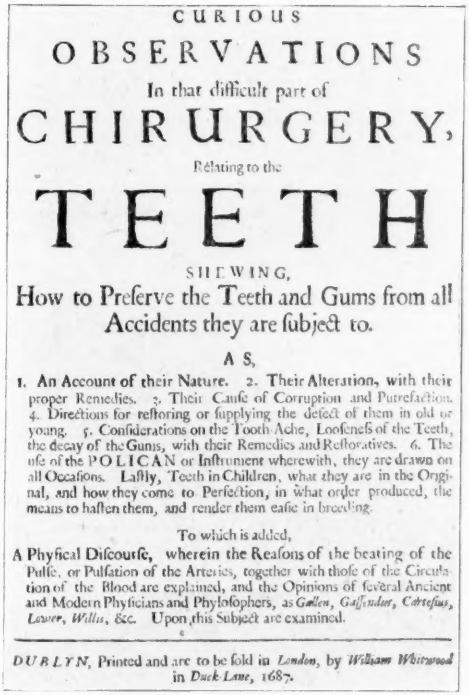
The next exclusive dental work of which we have record was also published in German, though not dated—*Nützlicher Bericht,* etc., by Walter Herman Ryff, about 1548. This book must justly be considered the beginning of original work in dental literature, as it is the earliest known book written by a practitioner and is distinguished on account of being the first for the profession in other than the Latin text.

The next attempt was an octavo volume of 304 pages by Francisco Martinez in 1557, published at Valladolid, Spain. It is the earliest dental work relating to operative dentistry. By far the most meritorious of the early works, a masterly original research on the anatomy, histology, physiology and development of the teeth, is that of Bartholomaei Eustachii, *Libellus de*

Dentibus. It was written in Rome and published in Venice in 1563.

The next we find is an interesting little monograph by Urban Hemard, published in 1582 at Lyons, France, a small octavo volume of 105 pages, of original and other investigations of practical experience and profound study.

When reading these observations, one must not lose sight of the fact that it was written thirty-six years prior to Fauchard, fifty-five years before Hurlock, eighty-one years before Herdmore and Ruspini, eighty-four before Hunter and one hundred and sixteen before Fox.



CURIOUS

OBSERVATIONS

In that difficult part of

CHIRURGERY,

Relating to the

TEETH

SHEWING,

How to Preſerve the Teeth and Gums from all Accidents they are ſubject to.

AS,

1. An Account of their Nature. 2. Their Alteration, with their proper Remedies. 3. Their Cauſe of Corruption and Putrefaction. 4. Directions for reſtoring or ſupplying the defect of them in old or young. 5. Conſiderations on the Tooth-Ache, Looſeneſs of the Teeth, the decay of the Gums, with their Remedies and Reſtoratives. 6. The uſe of the POLICAN or Inſtrument wherewith, they are drawn on all Occaſions. Laſtly, Teeth in Children, what they are in the Original, and how they come to Perfection, in what order produced, the means to haſten them, and render them eaſie in breeding.

To which is added,

A Phyſical Diſcourſe, wherein the Reaſons of the beating of the Pulſe, or Pulſation of the Arteries, together with thoſe of the Circulation of the Blood are explained, and the Opinions of ſeveral Ancient and Modern Phyſicians and Philoſophers, as *Galen*, *Gaſſendus*, *Cæſalpinus*, *Lower*, *Willis*, &c. Upon this Subject are examined.

DUBLYN, Printed and are to be ſold in *London*, by *William Whitwood* in *Duck-Lane*, 1687.

Title page of the first work on dentistry in the English language.

Recherche de la vraye Anathomie des dents. The work is not original, and is based on a list of forty-two authors whose works Hemard examined.

The first dental book in the English language is this one of Allen's. We thus see that up to the year 1700 dental literature had made a fair start in Germany, Spain, Italy, France and England, being the beginning of a long series of contributions giving the results

Contents of the Book

This work of fifty-eight pages and contents is 19 cm. long by 14 cm. wide. The first forty-three pages are devoted to an account of the teeth, while the forty-fourth page is an ad-

vertisement to the readers. Concerning this page, more will be said a little later. Pages 45 to 57 treat of the second part relating to the pulse, as shown at the bottom of the illustration.

The book opens with the following:

The Epistle Dedicatory to the most honourable and truly learned the physicians, chirurgions and apothecaries of the City of Dublyn.

Gentlemen,

When I see your INDEFATIGABLE Care in procuring men (than without which all the world is nothing) HEALTH, the PRIMARY cause, sole foundation and Prop of Humane FELICITY; and how the experience of so many years manifests to all men, by the happy success of your Undertakings, and your great Charity to the Poor, that your private intentions do correspond admirably well with your external actions; and that all your indeavours are real and unfeigned; I am perswaded, that whatever can in any wise contribute to the promoting of your most Noble and Generous Design, can't but be acceptable to you. Wherefore having with the same passion, for the publick Advantage, composed the following small Treatise, I take the liberty most humbly to present to You; that (as You are the best JUDGES of the thing) so You may by your Judicious and Impartial Censure of it, inform the world of its worth; that no person may be deceiv'd in it. For my intentions in publishing it, being to advance the common Good; if I thought it did contain anything contrary to that DESIGN, I shou'd be the first that wou'd indeavour its suppression.

But, GENTLEMEN, besides the foregoing reasons, which I had of offering You this first Essay of mine, I did it also to acquit my self in some measure of my Duty towards You; and to assure You further, that I am in all respects,

GENTLEMEN,

Your Most Humble, Most Obedient,
And Most Obliged Servant,
CHARLES ALLEN.

It closes with the following contents:

Section I. Of the Nature of the Teeth ..... Page 7
Section II. Of the Alteration of the Teeth 11
Section III. Of the Corruption of the Teeth, with their Remedies 15
The Description and Use of the Polican 17
Section IV. Of the Restauration of the Teeth 19
Section V. Of the Tooth-ake, Looseness of the Teeth, and decay of the Gums, with their Remedies 22
Section VI. Of Childrens Teeth 37
Advertisement to the Readers..... 44
A Physical Discourse concerning the Beating of the Pulse, and Circulation of the Bloud..... 45
The Explication 52

Allen's idea in writing this work is expressed in the proem, and may we not infer from it that here might be found the first reference to a dental practitioner.

THE OPERATOR FOR THE TEETH

THE PROEM

Knowing that it is the duty of every man, and especially of such as live in a Civil Government, (where the general interest always includes the particular) to contribute as much as he can (in his own station) to the publick Good and also of what Importance it is to all men to be informed of those Benefits which by my Art they may enjoy; I am resolved to set down here what I think most convenient for every one to understand concerning the preservation, and melioration of his own Teeth; a thing indeed of little esteem among most people, but in truth, of inestimable value for its many and important consequences. However, in so doing, I shall acquit my self of my duty towards God and Man; and provided my indeavors prove but beneficial to others, (as certainly they will, if put in practice) it is all I desire, caring very little what opinion the Criticks of Words and artificial Logick may have of me.

Of what Utility this Undertaking of mine may be to everybody, will appear by the sequel of this Discourse; whereof the scope is to prevent the loss of Teeth; the use of which is so necessary in the preparing of food, that the want of such a help (if not supplied by strong dissolvents) hinders a true concoction of the Ailments in the Stomach; whence do proceed Indigestions, and abundance of Crudities very noxious to the body of man; as being the seed of most of those innumerable Diseases and Infirmities, whereby life is not only made troublesome to us, but also considerably shorter than it would otherwise be, which is so consonant to truth, that vulgar observation itself has turned it into common Proverb: For they use to say of one whose Teeth are naturally thin, that he is short-liv'd.

whereof the reason is, that such persons do not chew their meat well. Moreover, the loss of Teeth renders the pronounciation both troublesome to ones self, and unintelligible to others. In a word, the corruption, and want of them, is as great a deformity, and of as much prejudice to one, as anything whatsoever can be.

SECTION I. Of the Nature of the Teeth.

What men are wont to call Science, or the Cognition of any being, is by them commonly divided into two several parts: one whereof is termed *Theoretical*, and the other *Practical*. The first includes the reasons and causes of things, with the order and manner of their progress in coming to be what they are. The second regards only their properties and Effects, and what they are actually in themselves, without inquiring how they come to be so made, or thus qualify'd.

And therefore being about to treat of my Art, I should by consequence begin with its *Theory* and discourse of the *Elements*, *Principles*, and first *Rudiments* of the Teeth; which make the Subject thereof, unfolding the reasons of their constitution and frame, and how they come to have several Roots, and to grow above the Gums; with whatever else may be the cause of their special being; and thence pass to the Practice. But some Considerations obliging me to defer treating of the former *Part*, or *Theorick*, till a better opportunity, I design only to lay down in this Paper some of the most principal *Points* relating to the other; namely, the Practical part of my *Profession*. In doing which, although it would be enough for us to speak of things, as in the state wherein we find them; yet for the satisfaction of the Reader, and out of a real desire to serve him; we shall not destitute our Discourse of such Reasons as are necessary for the well understanding of what we shall say. So that although this Tractate will be imperfect, as wanting many things, yet what it shall contain, will be as useful and advantageous as if it were accompanied with all the rest. However, according to the method we have prescribed our selves here, we are to proceed next to the consideration of the Structure of the Tooth.

In *Analysing* the Tooth, its substance is not found to be uniform every where, but manifestly distinguishable into two different sorts to make; one of them being harder, whiter, and of a finer texture; and the other softer, more obscure, and of a courser composition. The first makes up the head of the Tooth, or that part of it that stands out naked above the Gums; and the other its stump, or that part on't which is hidden within the said Gums. The exposed part of the Tooth consists also of two different Parts: To-wit, its stony Cover or Case, and its inward substance; the first is as it were an hard *Periosteum*, that invests the head of the Tooth on all sides, lying on it much after the same manner that Enamel does upon Gold, or any other thing. This natural Enamel which I call the gloss of the Tooth, is of a far harder, whiter, more dense and lucid nature than the inward substance lying under it: which for its several uses may properly be compared to the *Cuticula*, or scarf-skin, for like unto this it is bloodless, and altogether destitute of sense, serving to cover and defend the extremities of the Vessels, contained within the inward substance, from external injuries, and to render the Tooth more beautiful and strong. It has pores for the perspiration of the excrements of the Tooth, which pores are not always of the same figure, nor magnitude, but vary almost in every body. The said gloss or stony substance is likewise very various in point of thickness: from which differences, do arise the diversity of its colour in several men.

The inward part of the head of the Tooth, though inferior to its cover or gloss in brightness and solidity, yet its substance is nevertheless much more compact, and clearer than that of the stump; and contains two several sorts of pores, or small channels, both of a conical figure, having their *Bases* in the *concave superficies* of the Tooth, and their *Apexes* in the *Convex superficies* of the inward substance, immediately under its glassy integument. Through some of which channels the blood is carried by many and very small *Arterial* Sprigs, from the middle of the Tooth to its extremity: and through the others the same blood is sent back again from the said extremity towards its middle, by some *capillary* veins, as shall be said hereafter.

As to the root or stump of the Tooth, it is the darkest, most soft, and porous portion of its whole substance; and yet is closer and harder than any other bone of the body, having also two sorts of channels, but of different situation from one another; for some of them have their Bases (like those above described) towards the cavity of the Tooth, and contain the branches of the Artery, that carry the blood quite through the substance of the Tooth, to the Gums, as shall be explained in its place; but the others contrary to any of those already mentioned, have their Bases towards the external superficies of the Tooth; the use of which last conduits, is to transmit to the Gums the blood that is returned to the heart from the *membrane* that invests the cavity of the tooth. This rooty part of the

Tooth consists in the small Teeth of a single body, and in the big ones is divided into two, three, or four branches, called roots or fangs. There is a little channel that goes up to the head of the Tooth, where they are united together, and make out a single cavity, whereinto are carried the vessels of the Tooth, passing first through the hollowness of the stumps. Every tooth has its particular cell or socket within the *Mandible,* distinct from all the rest (by a thin production of the jaw-bone passing between the Teeth, from one side of the said bone to the other) wherein most of its stump is comprehened, the rest being incompassed about the Gums.

SECTION II. Of the Alteration of the Teeth, with their Remedies.

From the consideration of the nature of the Teeth, let us now pass to that of the first step of their degenerating, or mutation. For the better understanding of which, we shall take notice, that as our body is so made by nature, that it wasts continually by the dissipation of some Particles, separating themselves from its Mass, without intermission; (transpiring for the most part through the pores of the skin) and that if these particles (which being divided from the whole, become Excrementitious) are kept too long within the body, (by reason of the Opilation of the said pores) it causes Fevors, and great disorders in our blood and vital as well as animal Functions: so likewise from the substance of the Teeth are emitted certain *Effluviums* through their pores, the transpiration of which being hindred, (by the obstruction of those invisible passages) the Teeth become liable to all those infirmities hereafter to be mentioned.

The substance of the Tooth being rigid and inflexible, it cannot be *Opilated* by contraction, or astriction: as the skin usually is but only by the intrusion of some extraneous matter into its pores, or the incrustation of some slimy stuff upon it superficies; which is done when we eat any thing of a glutinous nature, for then some of its most viscous parts do stick, and cleave about the Teeth; and by the mixture of some tartarious particles coming from the Lungs, the heat of the mouth, and a certain petrifick juice distilling into the mouth, out of the *Salival Ducts* is turned into a stone-like substance, commonly called the scales or scurf of the *Teeth*: these scales grow thicker and thicker continually, and if let alone, will cover the *Teeth* all over, except just at the top where they grind one against another.

Having thus taken notice of the production of those scales, let us now consider of what ill consequence they may be to the *Teeth.*

The first whereof is the *Opilation* of their pores, from whence proceed all the rest: for by that the exist of those *Excrementitious* particles before mentioned being hindred, it causes them to stagnate within the body of the *Tooth,* and there corrupting, do corrode it by degrees; beginning first by the alteration of its colour from white to yellow and from yellow to black; and then follows the real decay substance.

The said humor is not only destructive to the Teeth, but extends also its malignity to the Gums; some of its particles being subtil enough (after a due *Fermentation*) to pass through the scales, and thence sliding between the Gums and the *Teeth,* they eat clear away the ligaments that tye them together, dividing them one from another to the very jaw-bone: which is sufficiently proved by the *excoriation* and rawness of the Gums, and their being so tender and loose from the *Teeth* where ever such scales are found; and expecially if they be grown to a considerable thickness.

It happens sometimes that the usual passages of this corrupted humor being stopt by the scales, (when they are hard, and close enough) is thereby repercussed, and made to take its course towards the middle of the *Tooth,* discharging it self therein between the *Concave superficies* of the *Tooth,* and the *Tunicle* investing the same; where it occasions very great pains, and at last by its fretting, and corrosive quality, gnaws and consumes quite away the said *membrane,* as also the vessels of that *Tooth*; and then passing out of the said *Tooth,* it dissuses it self through the *Alveolus* or socket, where exerting its dangerous faculty, it destroys utterly whatever causes any *Connexion* between the *Teeth,* the jaw-bone and the Gums, as the *Periosteum,* etc. After which the *Teeth* do consequently fall out for the most part found, and unaltered, except only in their colour, (which becomes yellowish) by reason that the aforesaid *Excrementitious* Humour being at first diverted another way, did not stay long enough under the scales to occasion in them a greater detriment: All which incommodites to obviate, keep only your Teeth clean from scurf, or any foulness; and if they be already clean, you need but to preserve them as they are; but if not, get them to be made so by some Artist in that Function; for otherwise if you employ anybody that is unskilful in it, you may chance to find the Remedy worse than the Disease; by reason not knowing the dangers attending such an Operation, he may commit a great many and pernicious Errors, as the breaking of the *Film* that unites the

Gums to the Teeth, the taking away of the gloss of the Teeth. Soon after which, the Tooth will lose its natural lustre, and become yellowish, subject to ake, and at last wholly perish away, the Gums being loose and broken, will likewise decay, and fall away from the Teeth.

Your teeth being once clean, you may preserve them with this composition; Take *Magistery of Pearls, Powder of Coral,* and *Dragons-Blood,* of each equal quantity, and as much *Red-Rose-water* as will incorporate them together; and make the Compound of a mean consistence, between hard and soft. I have to that effect a very excellent *Dentifrice,* which being used only once a week will keep the *Teeth* clean and white; and by the constant using of it, fetch up their colour, if lost; (though in a considerable measure) this is the same that in my *Bills* (to keep my Masters term, the improper, as he well knows himself), I call an *Opial.*

SECTION III. *Of the Corruption* of the Teeth, *with their Remedies: Whereto is Annexed the Description and Use of the Polican.*

Having in the former section considered the *Teeth,* as at the beginning of their decay, in such a condition as tho they suffer some light change in their accidents, yet their substance, form and proportion remaining still the same, is only called alteration; that is, in a state wherein indeed they are environed, and assaulted by their greatest enemies, but yet in a capacity of being rescued and preserved from their harms. But now we shall consider then as overcome by all those threatning evils, and really corrupted; in which case, all that can be done, is to prevent their total ruine.

And as there are some not so far gone, but that they may still do good service, if timely helped, we are to use our utmost indeavours to do it; which to effect, we shall in the first place clear their outside from all foulness and then with a proper instrument scrape off whatever is rotten within, washing them very well afterwards with some convenient liquid, to scour and smooth away what the instrument may leave behind: and then if the Tooth be hollow that it may be stopt, it must be fill'd up with such ingredients as are neither corrosive, nor ill tasted, and of a consistence firm enough to be used in the same manner as the *Teeth* are, and to keep from wasting for a considerable time; but if the *Tooth* rots every way equally, so that there is no cavity left, wherein anything can keep fast, it must only be kept clean, taking care after every meal to pick out any meat that may get into it, and then wash it very well with fair water; for if you neglect so to do, the corruption of the rotten *Tooth* will fall upon the others, and so infect all the rest.

With these precautions, I would advise every one to keep his *Teeth* as long as he can, although they were rotten to the very Gums, provided only they do not ake, by reason that their stumps filling up their sockets, serve (like so many wedges) to keep the others streight and firm in the places; but if they are very bad, and withal subject to ake, it is better to have them out, lest they should occasion an ill habit in the Gums, that might be hurtful to the sound one.

The Drawing out of *Teeth* is practised by a great many, but perhaps understood but of very few; and I am sure that there is a great deal more danger in the Drawing of a *Tooth,* (especially out of the lower Jaw) than most people are commonly aware of. It is an Operation that requires to be performed with great care and circumspection, and not so rashly as it is commonly done.

But as the greatest difficulty of this Business lies in understanding the make, and application of the Instruments that are imploy'd about the Drawing of *Teeth*; I shall (for the benefit of the *Practitioners,* as well as of those that will be their *Patients*) subjoyn here, the description and use of the *Polican;* which is one of the best of them.

THE DESCRIPTION AND USE OF THE POLICAN

The Construction, and usual shape of the *Polican,* is a thing so well known by everybody, that it wou'd be needless to insist at all upon it. And therefore, without losing time in such superfluous Discourses, we shall here take notice of some other things appertaining to the said Instruments, more material and useful: as the due proportion that its parts ought to have, considered in themselves, and in respect to each other.

In the first place then, (supposing that you know the stuff wherewithal it must be made, which ought to be a tough steel, or steel and iron together) let the tree of the *Polican* be about four inches long, and so perforated,. that the distance betwixt the centre of the hole (wherein goes the pin, upon which are fastened the two branches) and one of the extremities, be a line greater than the other. Let one of the two branches be two lines longer than the other; let also each claw be three lines long. And finally, let the distance between the bolster, or semicircle of the longest side of the tree, be two lines. And you will have four distances between the claws and the bolsters, which is

sufficient to draw all sort of *Teeth*. For with the first, which is of two lines, you may draw the *Incisores*. With the second of three lines you may draw the *Canini*. With the third of four lines, the *Double* and *Treble Teeth*. And with the fourth, of five lines, the *Quadruple* ones.

Your *Polican* being thus made, if you have a mind to use it, you must so apply the Claw to the inside of the *Tooth* you may intend to pull out, that its branch may stand exactly upon the middle of the said Tooth, gently leaning you Bolster upon the next to it, the better to take your measures; and then draw the *Tooth* out. But take heed you do not draw *obliquely*, but in a direct line from the *Tooth* outwardly; for in drawing laterally, you might chance so to force the Tooth to be drawn, upon the next to it, that wou'd draw them both together, or at least loosen very much the sound one, and put a far greater force upon the other in drawing it, than is necessary. Which wou'd occasion an infinitely greater pain to the *Patient*, than if you had done it rightly.

Thus much have I thought fit to tell you concerning the nature and use of the *Polican;* which if you observe punctually, you need never fear the Drawing well of any Tooth. As for the rest of the Instruments now in use, with several others of my own Invention, I shall give you the particular Description, and use of every one of them in the next Impression of this Discourse; if you think this worth of your acceptance.

SECTION IV. *Of the Restauration of the Teeth.*

When our decay'd *Teeth* are so far gone before we think of any Remedy for their preservation, that whatever we can do, proves but fruitless; And that notwithstanding all our best indeavours, they perish, and rot quite away; or that some intolerable pain has made us to draw them; we are not yet to despair, and esteem our selves *toothless* for all the rest of our life; the loss indeed is great, but not irreparable; there is still some help for it, the natural want may be supplied artificially, and herein Art imitates Nature so *naisly*, that when the *succedaneous* Teeth (if I may so speak) are well set in, they cannot be distinguished from the natural ones, (neither in colour, firmness, nor proportion) but by them that know of it. Being thus exactly fitted to their place, they will keep the next to them, and by consequence all the rest of that Jaw abundantly firmer and stronger than they would otherwise be.

The Advantages that may be attributed to the artificial *Teeth*, are many; as that they keep the other fast, as we said just now, that they are of a great ornament, and help pronounciation extremely. But all that is with a *Proviso*, that they be well made, and according to the best Art; for otherwise they might prove quite contrary.

Besides this Artificial way of repairing the loss of *Teeth*, there is another that may be called Natural; which is done by taking out the rotten *Teeth* or stumps, and putting in their places some sound ones, drawn immediately after out of some poor body's head: which thing (tho difficult) I know to be feasible enough, not only by my own reason that tells me so, but by experience itself, as (to say no more at present) may be instanced in the case of a certain Lady, who thinking to have *two Teeth* growing one on the top of another, came one day to my Master to have one of them Drawn: my Master told her that they were not two distinct *Teeth*, but only a double one; but the Lady being not satisfied with this, desired him to take out the *Tooth* she had told him of, let it be what it would. The Tooth being drawn out, and proving as my Master had said, it was quickly set again into the Jaw; and with the use of some convenient and proper Remedies, became in a few weeks to be as firm again as any of the rest.

And yet although the event of this particular had not proved so prosperous as it did; its ill success would not destroy in me the possibility of such a transplanting, or *Inoculation* of *Teeth*: (If I may be permitted to use such terms) that was not the only motive I had to believe it; and I have not inserted the Story of it here as an Argument to prove invincibly what I say, but only as a proper Example to render probable to others what I know to be true. However, I do not like that method of drawing *Teeth* out of some folks heads, to put them into others, both for its being to inhumane, and attended with too many difficulties; and then neither could this be called the restauration of *Teeth*, since the reparation of one, is the ruine, of another; it is only robbing of *Peter* to pay *Paul*. But if instead of humane *Teeth*, there is use made of those of some *Brutes*, as *Dogs*, *Sheep*, etc. In such case I do not only approve of it as lawful and facile, but do also esteem it as very profitable and advantageous; only care is to be had, that the thing be undertaken, and carried on by one that at least knows something of Anatomy, and has a right sense of the thing to be done, being furnished with whatever is necessary in an operation of that nature.

And that (if my Opinion may be any wise serviceable in such an Attempt) I may con-

tribute something towards the improvement of so useful an Invention; I think one is, to proceed in it somewhat after this manner. First, I would chuse an Animal whose *Teeth* should come nearest to those of the *Patient;* as a *Dog,* a *Sheep,* a *Goat,* or a *Baboon,* etc., and having tied his legs together, I would fasten his head in some convenient place, so that he might not stir in the least, and by some proper means keep his mouth open as long as I should have occasion: that done, I would open the Gums round about the *Tooth* to be taken out of his head, not only to the very Jaw-bone, but as far between the said Bone and the Tooth, as the finest Instrument could go, leaving a very little portion of the Gums about it; and then having used the same circumspection, in dividing the Patient's Tooth from the Gums, and the Jaw-bone, I would draw it forth, and put immediately in its place that of the Brute; fastening it very well and streight between the other Teeth: and then with the use of suitable Remedies, I do not question in the least but that it would unite to the Gums and Jaw-bone, and in a little time become as fast as any of the others: which performance might properly be termed the natural Restauration, or *Renovation* of Humane Teeth.

SECTION V. *Of the* Tooth-ake, *Looseness* of the Teeth, *and decay of the* Gums; *with their Remedies.*

The *Tooth-Ake* is occasioned many and very different ways, but that I may render what I have to say upon it, as perspicuous and intelligible as I can; I think it very convenient we should take a special notice of the vessels that come into the Tooth, and of their respective Functions. The first and chiefest whereof is an Artery, whose Office is to bring directly from the heart that hot and spirituous blood, out of which (although it is not the general Opinion) the Tooth is at first made, (as well as the rest of the whole body) and ever after preserved and repaired by the supply of nourishment, and vital principles it affords continually: To this effect the whole Artery divides it self into an infinity of small branches, which being disseminated throughout the whole substance of the Tooth, distribute to each part as much of their blood as is necessary to make up the incessant loss they are subject to; and the rest is returned through innumerable hair-like veins into the great ones, and thence to the heart again, but in two different manners: for the superfluous part of that portion of the blood, that is carried by the *Capillary* Arteries to that part of the Tooth standing above the Gums, is sent back again through some *Capillary* veins towards the middle of the Tooth; where uniting together, they make but a single channel; and this is it we commonly call the vein of the Tooth, which we shall here take for its second vessel. But the remainder of the blood, that goes to the relief of that part of the Tooth that is within the Gums, passing quite through the substance of the Tooth, is carried by the *Capillary* veins to the veins of the Gums, Cheeks, and Lips; and hence it is that whatever pain is at any time occasioned in any of those parts, (either by bruise, excessive heat, or cold, etc.) comes to be soon after communicated to the Teeth.

The Third and Last Vessel of the Teeth is a Nerve, one of the extremities whereof is expanded through the *Membrane* that invests the cavity of the Tooth, and that, that contains its Vessels; and the other is rooted in the Brains, from whence it takes it *Origine,* and where the Animal Spirits being elaborated, are thence sent by the Nerves to all the parts of the body, to administer sense, and the cause of motion to them, although in some, (as the Teeth) the faculty of motion is not exercised.

From this consideration of the Vessels of the Tooth, we may gather the following reasons of its Dolour: As first, that if either through the too great quantity, or ebulition of the blood, the Artery is so dilated and swoln, that it fills up the hole at the end of the stumps where it enters the *Tooth,* and consequently so compresses the vein going out the same way, that the circulation of the *Blood* is thereby hindred; the continual flowing in of the *blood* will extremely puff up, and distend the *membrane* that contains the vessels, and consequently cause a great pain in the *Tooth,* which will last till either the *preternatural* state of the *Blood* be changed, or that the Arteriols which we have said to pass quite through the rooty part of the *Tooth* be so stretched and widened, that by them the *Blood* may be discharged into the Gums, Cheeks and Lips; where it will then cause a swelling, greater or lesser according to the quantity of the superfluous *Blood.*

And if at the beginning of this disorder, when the Vein is first impeded in its *Function,* the motion of the *Blood* is so rapid, and its influx into the Tooth so impetuous, that before it can make its way through the small *Arterial* Twigs into the Gums, it does extremely extend the coats of the *Artery,* the *Interstices* between their *Fibres* will thereby become wide enough to give passage to some of the thinnest parts of the Blood; which gather-

ing at the end of the root, between the outside of the *Artery,* and the common Coat investing all the Vessels, will there putrifie, and cause a great and very lasting pain in the Tooth; during which, if the Tooth be drawn, the said gathering will appear at the end of its stump like a little Bladder.

You shall know this sort of *Tooth-Ake* by the high beating of your Pulse, the fulness of the Veins, and an often beating in the affected Tooth; with a continual, tho not very extreme pain. And then for the cure of it, you must first bleed the Gums, and sometimes open a Vein in the Arm also, and wash your mouth with *Rose-water* and *Vinegar,* of each equal quantities mixt together; putting a little Cotton dipt in *Oyl* of *Box* into the Tooth, if it be Hollow.

Furthermore, if that portion of the *Blood,* which is diffused through the substance of the Brain for the production of the *Animal Spirits,* is so depraved, that all the sifting it receives, through the hidden *meanders,* and recesses of the Brain cannot clear it from its impurities; and that notwithstanding all the contrivances of Nature it is deposited into the *ventricles* of the Brain, (tho under another form yet) still impregnated with its ill qualities: such sort of *Animal Spirits* being compounded of *Heterogeneous* parts, if not timely discharged of their malignant and offensive *Corpuscles,* (through the usual *Emunctories*) will either by their fermentation in the *Ventricles* of the Brain, cause an Head-ake; or by the opilation of its pores, cause a giddiness; or else passing out of the Brain into the Nerves, will by their irregular motion, and preternatural extention of the coats of the Nerves, and other Tunicles, breed a disturbance in all the parts they go to, but more particularly in the Teeth, in which they always excite very great pains. For discharging the peccant humor, between the *membrane* that invests the inside of the Tooth, and that that incloses its vessels, it occasions a perpetual torment in them, till it is expelled from thence by *transpiration.*

This second kind of Tooth-ake will be known by a disturbance in the head, which precedes it most commonly; a soreness in the joynts, and a certain drousiness and lingring pain all over the body, as if one were inclined to an Ague, with a sharp and very excessive pain in the distempered Tooth, which comes by fits, soon ceasing, and often beginning a-new. As for its Cure, it may be effected by *Sternutation,* the *friction* of the nape of the Neck with warm clothes, and the application of *aperitive* Remedies, to open the *pores* of the Tooth: and if it be hollow, you shall put in't a drop of Oyl of Camphire, whereinto has been infused some Henbane-root. These are the two general causes of Tooth-ake; all the rest proceeding from them, some few excepted.

There is what I had a mind to say at this present concerning the Tooth-ake. But you must note further, that as it is not enough for one that intends to travel a *Countrey* over, to understand the *Map* of that *Countrey;* but he must also inquire often of the people he meets with as he goes on his journey, for the way to such and such a place: so although I have given you a true account of the Tooth-ake, and have delivered here the right method for the curing of it, yet that Disease is for the most part accompanied with several circumstances, that can't be learnt but from *experience* itself. Thus sometimes the Gums will be *livid,* sometimes *pale,* and sometimes *red,* and inflamed. Sometimes the Tooth is *loose,* and risen above the others. And sometimes its *root* is discovered, and bare of flesh. Sometimes its *rotten,* and otherwhile *sound,* as to its *substance.* In fine, sometimes the pain is accompanied with a great *fluxion* of *Rhume,* and sometimes with a dryness of the *mouth.* Each of which *concomitants* requires a particular consideration, and peculiar Remedies; considering always these things, with reference to the age, constitution and habit of the *Patient.*

Again, it is but rarely, that a *Tooth-ake* is found *simple,* or *uncompound*: (as we have supposed to be, those of which we have treated above) that is, occasioned by one cause only: but it proceeds most commonly from several; and especially if the pain be inveterate, or of a long standing. And then, the *symptoms* of this *complicated* Disease, are mixt in the same proportion as their *causes;* which renders the Cure much more difficult, and subject to more observations. And therefore, if any one has a mind to render himself perfect in these things, he must not follow our method, that directs him to the true *knowledge* of them, but the *dictates* of his own senses also; by which he will avoid all the *obstacles* he may meet with by the way. Notwithstanding all which, people being commonly unwilling to undergo all the troubles attending a *methodical Cure,* and withal apt to think, that one does them no good at all, unless he give them ease presently; I have been forced to abandon the *Art* in my practice, and to invent certain general Remedies; which nevertheless applying with *circumspection,* and as I think occasion requires, hardly ever fail of producing the intended effect: sometimes in an instant, but most commonly within less than half an hour. True it is, that were it not for my former practice, and long habit in

those things, I neither cou'd have, nor expect so good a success.

And yet I will not deny, but that said remedies happen sometimes to *operate* a great deal slower than ordinary. But that comes to pass by reason of some unexpected, or unobserv'd *accidents*: and I think it ought to suffice, that the Cure be at last performed. Yet this does not satisfy every body. If the Remedy does not immediately Cure such as are *Impatient,* or incapable of reasoning, they strait condemn it as a thing ineffectual, and altogether void of any *Virtue*. Upon which, believing the Stories of some impertinent (tho perhaps well affectioned) friend they make use of such thing, as commonly hinder the effect of the Remedy. And if it happens sometimes that nothwithstanding those impediments, our remedy produces its effect; they never fail of attributing the Cure to their own indeavours.

However, I must ingenuously confess, that my Remedies do not take effect always. And that there are some sorts of *Tooth-ake* almost incurable, unless it be *palliatively;* and that it self, not without a great deal of trouble, and a tedious while. The reasons of which, I shall take occasion to explain some other time.

The looseness of the Teeth, come most commonly from the decay of the Gums, which are subject to many infirmities, proceeding for the most part from those things that occasion the *Tooth-ake,* and putrefaction of the Teeth; for sometimes there will be such an affluence of *blood* from the *Teeth* into the Gums, that their veins being not able to contain it, are thereupon broken; shedding the *blood* between the Gums and the *Teeth*: where gathering together, it corrupts, rotting away all the flesh from about the Teeth: otherwhiles the *excrementitious* humour, that *exudates* out of the Teeth, falling upon the Gums, eats them away by degrees. But above all other things, the scales, and foulness of the *Teeth* are very prejudicial to them. All which infirmities to avoid, you need but to keep your Teeth and Gums neat and clean from any foulness whatsoever; as has been already said in the foregoing sections: preventing any preternatural collection of *Blood,* or any other humours within the Gums. But if the mischief is already done, that is, if your *Teeth* be really loose, and your *Gums* wasted, you must have recourse for their recovery to one well versed in those things. For to prescribe you here any form of Remedies, would be to no purpose, since the same thing cannot be equally good in all cases, and that without the perfect knowledge of the cause of the Disease, and a right method in applying suitable Medicaments, (which commonly is understood only by Practitioners in those concerns) it is impossible ever to perform the Cure of any Distemper.

Yet, that you may not think me remiss in any thing belonging to my Profession, that may concern your welfare; and by reason that you may chance to find yourselves in a place where there will be no *Artist* to help you; I will here communicate to you a general Remedy against the decay of the Gums, and looseness of the *Teeth;* which I am sure, if you use carefully will often answer your expectations: At least it will be such, that it shall always do you some good, and never any harm. But I must tell you before hand, that if your body be *Scorbutick,* and full of ill humours,, you must first be *Blooded,* and *Purg'd,* according to the direction of a good Physitian; and then you may use the said Remedy as followeth.

Take of *Mastick, Myrrh, Pine-Apple, Dragons-blood,* in drops, all reduced into Powder, of equal quantity, red *Coral* prepared, flowers of *Pomgranats,* of each double the quantity of the other *Ingredients;* and steep them all in a proportionable quantity of *Spring-water* upon warm *Embers,* for the space of a natural day; and then filtrate the *Infusion* through a woolen-cloth, and keep it close in some convenient vessel. And when you have a mind to use it, you shall take two or three spoonfuls on't a day, keeping it in your mouth a quarter of an hour every time: which you must continue to do while necessity shall require it.

I might have told you at the beginning of this Section, where I spoke of the vessels of the Teeth, that their Artery comes from the *Carotids*; the vein from the *Jugular,* and the sinew from the fifth pair of Nerves: but if you are skilled in *Anatomy,* you know it better than I, and if not, my telling you of it to you would signify nothing at all, unless I should in the same time, give you an accurate description of all those vessels tracing them from their *Origine,* even to the very last of their Divisions, and furtherest extremities; which would be improper in this place.

SECTION VI. *Of Childrens Teeth.*

Having hitherto spoken of the *Teeth* in reference to adult persons, and such as are past childhood: we shall explain in this Section, as succinctly, and withal as clearly as we can, what is necessary to be known touching their growth, and change children a thing of no small consequence, since the life of Infants is therein so often concern'd.

The Child being born, remains *Toothless,* till he is about five or six Months old: at

which time his two foremost Teeth in each Jaw begin to appear, without keeping any constant order of Precedence: sometimes those above coming out first, and sometimes those below. After them follow all the rest successively in both *Mandibles* so next to these come the four other *Incisores,* the four *Canin* or *Dog-Teeth,* and the first eight *Molares,* (which are properly the double *Teeth*) and then come the four biggest *Teeth* of all, which may be called *Quadruple Teeth,* as being about three times bigger than the small ones: and after that the eight last *Teeth* do follow; which in respect to the *Incisors* may be treble *Teeth.* But these treble ones usually vary very much in time of growth, for it is but rarely that they all come forth in the same year, the four last of them seldom coming out before the one or two and twentieth year of our age; for which reason such *Teeth* are called by some, *Teeth of Wisdom,* because that by that time, we should have a full use of our rational *Faculty,* though God knows how ofte it proves to be true.

The eight *Incisores,* and the four *Dog-Teeth* come the first year; the eight double Teeth the second year, and the four Quadruples, with the four First *Treble* ones, the third. During the time of their eruption, and especially when the four *Quadruple* ones break forth out of their Sockets, children are subject to Fevers, and great alterations, which weakens them extremely, and often puts an end to their days; which comes to pass most commonly, for want of help to facilitate their issue out of the Gums.

And as I look upon the knowledge of Childrens *Teeth,* as a subject properly belonging to my Profession; so I think my self oblig'd to amend, amplifie, and render it as conducive to the preservation of the life, and health of Children, and to the preventing of all those Infirmities wherewith they are afflicted, (upon the account of the first coming, and shedding of their *Teeth*) as my weak indeavours can make it. And therefore I will to that end deliver here in few words, what reason and experience have taught me concerning the same; Proceeding thus,

In the first place, I would advise such as may be concerned in this Affair, to take a special care in observing when the Child's *Teeth* begin to trouble him: which (besides his forwardness, and excessive crying) may be known by his *salivation* or drivelling (as Nurses are wont to stile it,) and the inflammation and swelling of his Gums; and as soon as you perceive it to be so, you are to wash his mouth now and then with the following mixture: *Take* seven or eight as new *Figs* as you can get, and boyl them in a pint or more of Whey, till they grow very soft, and then squeeze the *Whey,* and as much of the substance of the *Figs* as you can through a cloth; of which liquor take half a pint; of Honey of Roses, and Syrup of Violets, of each half an ounce; and three or four spoonfuls of *Plantain-water*: mix all together, and keep it close in a Bottle. The best way to use it, is with a stick of Liquorish beaten at one end into a small thread like a Comb-brush, or little Broom, with which, being dipt in some of the said Liquor, you shall wash and rub the Childs Gums, (especially where they are tunified) at least five or six times a day, continuing so to do, till you perceive the Gums to grow white above the *Tooth*: (which is a sign of great pain in that part, and that the young *Tooth* will in a little time break through the Gums (and then take a *Lancet,* or a very sharp *Pen-knife,* and divide the white place, cutting it down to the head of the subjacent *Tooth,* with two *Incisions* crossing one another at the centre of the white spot, continuing to use the mixture as is afosesaid till the *Tooth* appears above the Gums; observing to use the same method at the coming out of every *Tooth* which you may know by the foregoing tokens.

Now the *Teeth* being all come out (except only such as remain latent within the Jaw, till about the two and twentieth year of one's age) they keep firm and strong till the child is a matter of six or seven years old, and then most of them grow loose, and a while after are cast clear out. The *treble Teeth* never change, the *Quadruples* very rarely, but the *Incisors,* the *Dog-Teeth,* and the double ones always do, sometimes whole, (and then the *second Teeth,* or those that are to succeed them, are a long time before they grow up again;) but most commonly their head only comes off, the other part remaining still for the making up of the next Tooth; like unto the first production of a Vegetable Seed, or tender Sprig of a young Plant; for as the upper part of this being withered in the *Winter* following, by the rigorous cold of that Season, drops off in the next Spring: (by reason that its texture being yet loose, and less firm, the pores or sap carrying vessels, are over much dilated by the great affluence of the *nutritive* juice, and so give admittance to some indigested and grosser *particles* than is convenient for the nourishment of the Vegetable: which particles being irregular, and unactive, their motion is soon stopt; when as a great cold intervening, compresses a little the young Plant round about, so that they are congeal'd, and become *fixt* in their *Ducts,* or leading

pipes, whereby that part being deprived of its due nourishment, fades away, and dries up,) and is succeeded by a new Sprout shooting out of the stump, or remaining part. So likewise the young *Teeth* coming into the cold air, when they are yet tender and less solid: those of them that are more susceptible of alteration, and more exposed to the inclemency of the weather; (as must be those before, which by reason of their smallness and situation, cannot but be more subject to *adventitious* accidents,) are thereby chill'd and repressed, and their parts thrust near one another, and driven back towards their centre, from whence the substance of the *Tooth* becoming closer, and the intervals between its parts narrower, and interrupted in several places, by the irregular motion of some of the minutest of those parts, (which by reason of their unstableness, and flexibility, being disposed to advance and obey the action of external Agents more than the others, do move disorderly, and spoil the structure of the rest:) the small Veins and Arteries therein dispersed, will become so extremely compressed, that the bloud they contain (which in Children is most commonly gross and impure, as is apparent by their stupidity, and filthy scabs; as well as by that Feverish disposition they are always inclined to; which argues a great disparity between the parts of their bloud,) is thereby stopt in its course, and detained in them; where the grossness of its parts, and their incumbring figures will soon dispose them to rest, and remain intangled and coagulated together.

If you chance to reflect upon what I say, when I ascribe the great agitation of Childrens Bloud, and its being quiet and fixt in their Teeth, to the same cause, viz, its foulness, and the incongruity of its parts; you will perhaps be as angry with me, as the Satyr was against the Traveller of the *Fables,* for his blowing hot and cold with the same breath. But if you consider it a little more attentively, you shall find that this, as well as the said *Apologue,* may easily be reconciled with Reason.

Furthermore, the Bloud coming from the live part of the Tooth, to enter the other; and being hindred thereof by the narrowness of the passages, and resistance of the condensed bloud, is upon that necessarily determined to imploy the force of its motion round about, against the parts lying immediately between the dead portion of the Tooth, and that which is alive; the which it consequently loosens by degrees, and at last breaks them all asunder; separating thus the live body of the Tooth quite from its dead head; and the space left between them permitting the *trunk* to grow, it shoots a new head; which rising above the Gums, thrusts out the old one, becoming a perfect Tooth in its room.

But if in the mean while, through the too great adherence of the dead part of the Gums, the other is depressed, or retarded from growing, and by consequence is detained under the former too long; some of the broken *particles* remaining between them, will corrode, and eat holes in the new head of the Tooth, and so it comes out already perished: which to prevent, the first Teeth must be drawn out as soon as they appear any thing loose.

Moreover, it happens sometimes, that the new head of the Tooth is nourished, and increases so fast, that being obstructed by the too great connexion of the old one, to the adjacent parts, from advancing in its right cours; it turns aside, and makes its way through either the inside, or outside of the Gums; and so it grows biassing, and out of rank. This defect is remedied by drawing out the superfluous Tooth, and the use of some convenient means to bring the new Tooth into its place; which is very easy to do, if undertaken at first, but otherwise a great deal more difficult; and especially if the two next Teeth are approached so near one another, that it cannot be contained between them, without being lessened, or the others put further off from each other.

Note, That in drawing out the old, or sucking Tooth, a great care is to be taken not to hurt the new one, lying under it.

SECTION VII. *Of the Acceleration of the Teeth.*

The five first of the foregoing *Sections* have been imploy'd about mens Teeth, and the sixth about those of Children: but this seventh and last Section of our Discourse shall respect both men and Children, for it will not only teach how to hasten the growth of Childrens second Teeth, when it happens to be delay'd, or retarded too long; but also how to *Accelerate* the coming out of those in Men, that are called Teeth of Wisdom. Which last, without the help of Art, hardly ever appear before almost half of our life is already past away; And when the time of our growth is over: during which, we have the greatest occasion for them. But because the bare saying or asserting of any thing without proofs, or some reasons to render it probable, has no force to perswade any man of its truth, nor to make him sensible of what utility it is of; We will elucidate the matter in hand, by an example drawn from the motion of Seeds sown in the Earth. Now the quick or slow *germinating* of Seeds after they have been sown, depends upon their being

buried shallow, or deep in the ground; the lightsomness or heaviness of the Earth, and its good or ill manuring, and the proportion of humidity that dilutes it, as well as the head of coldness of the season: the several proportions of either of which accidents, alter and vary the progress of the Seed, according to their prevalency in respect to each other.

For in a well prepar'd Soil, being cherished by the warmth of the Sun, and duly *diluted* with water, the Seed will budd a great deal sooner; the lightsome Earth easily yielding to the *expansion* of the *Semen;* when it *imbibes* that *Succus Nutritious,* which *Transcolating* through the coats of the Seed, and impregnating its Parenchyma, causes by its fermentation therein, a gentle shake, and a *vital* motion in the *Radicle,* and *Plume;* (as the Learned Doctor *Grew* call the *Seminal Root,* and *Trunck* of a Plant in *Embryo*) whereby they are impowered to *Extricate* themselves out of their *Integuments,* and *Parenchyma;* and begin to *vegetate,* and grow like a Plant.

But the Seed being buried deep in a cold, cloggy earth; will, by the stubborn *Cohesion,* and lumpishness of the said earth, be kept from dilating itself, and consequently from receiving those particles that are altogether necessary for its *vivifying,* and *augmentation.* From when it follows, that its growth (if not helped by Art) will be check'd, and obstructed till the heat of the Sun has opened the ground, and set its particles in such motion as they ought to be, to enter the Seed, and *protrude* the earth upwards.

So likewise Childrens Gums, being yet tender, shallow, and loose, and withal prepar'd, as we have taught heretofore in its place, their first Teeth come out, and grow easily; as also do their second, if in shedding of the first, their heads only come off; for the others do grow up so soon, that the Gums have hardly any time to close up again. But if the sucking Teeth do shed root and all, the matter out of which the next (which I call *Novel-Teeth*) are to be made, will not only be a considerable time in disposing it self into the requisite form, but when the first lineaments are drawn, and Nature has accomplished her first work, the Gums will be reunited together, and grown so hard by that time, that their resistance will oppose it self to the growth of these Teeth, till a stronger nourishment produces more and hotter Bloud, and a greater quantity of *Animal Spirits;* by which the Gums being made hotter, and more spungy, and the nutritive juice increased, the issue of the said Teeth will then be *facilitated,* and their growth perfected.

To the consideration of these *Novel-Teeth,* may partly be referred that of the last treble ones, or *dentes sapientiae.* It's true, these are stay'd a great deal longer under the Gums than the others; but also they have more causes that impede their growth. For, besides what, the Gums are more sinewy, and *membranous* about them any where else, and therefore much more difficult to *penetrate*: That part of the Jaw-bone that contains them, is likewise much thicker, and stronger than any other; and consequently, harder to be divided by the included Teeth; which being incapable of making their way through it, are forced to stay therein till such time that Nature having perfected our growth, the *bloud* becomes hotter, stronger, and its *energy* more powerful by the firmness of the Heart, (which is the Sun of our *Microcosm,* or little-world) and other principal parts, and increase of those *particles* that were wont to be imployed in making up, and augmenting the body; most of which remain then in the mass of the *Bloud;* whereby the said *bloud,* being able to surmount the resistance of the Jaw and Gums, forces the said Teeth to come out of their cells, and grow up.

To the efficacy of this new strength of the *Bloud* upon the arrival of Nature to its highest *Period,* may be attributed the causes of those alterations that usually happen in mens bodies about that time: many looking pale, and being troubled with divers infirmities till then, of which they are afterwards delivered. But leaving off Digressions, let us return to our Subject.

We have already observed, that the *Novel-Teeth* in Children, and *Dentes Sapientiae* in Men, cou'd not arrive to their perfection, nor therefore become serviceable to us without a long time, and a great *Effort* of Nature. It remains now, that (pursuant to our design, as we have declar'd it at the beginning of this Section) we indeavor to find out some means, whereby we may remedy those defects; in facilitating Nature's work, and rendring those *tardy Teeth* above-mentioned, serviceable to us as soon as we can. And as I find none more proper and expeditious, than the *Rarifaction,* and *Dilatation* of the Gums, so that they may lose their greatest stubbornness, and become more yielding to the Teeth: I conclude that all the difficulty lies in knowing how such an effect can be produced: which (after a due consideration) I think may be performed after this manner.

In the first place, there is need of an Instrument made of Gold, or Silver, about a foot long, as big as a Tobacco-pipe, and like a *Syringe*; being so bored, that a perfectly Cilindrical embolus, or sucker, may fill exactly nine inches of its *Cavity;* the rest being made

a good deal smaller, and bow'd like the Blowing-pipe of *Watch-makers*; which ought to end into an head resembling the cup of an *Acorn;* and so contriv'd, that it may imbrace the Gums exactly. Your Instrument being ready, if you have a mind to perform the Operation, you must in the next place (concerning the *Dentes Sapientiae*) tie all the *Teeth together,* (which may be done without any trouble) so that the two foremost of them may draw the last of all towards the sore-part of the *mouth.* By this the included Teeth will be freed from being *compressed* between the others, and the extremity of the Jaw-bone. And then the Gums being prepar'd by *Emollients,* and *relaxing* things, apply the end of your *Syringe* close upon the Gums, under which the imperfect Tooth lies; and then draw the *Embolus,* and the top of the Gums will follow and rise within the little *Acorn-cup-like* end of the Pipe, as the flesh usually doth under *Cupping-Glasses.* Keep it a while so, and then take away the *Syringe,* and *sacrifice* that part of the Gums that was drawn within the Pipe, in several places; *reiterating* the same *Operation* twice a day, for about a fortnight, omitting only the *Scarification,* which it to be used the first time only. By this means it appears probable to me, that the Gums yielding, the force of the *Blood* will compel the *fibres* or *minute* parts of the imperfect Tooth, to advance according to their natural order, and situation; and so cause the said Tooth to grow.

As to the *Novel-Teeth* you shall follow the same method, and use the same means in *facilitating* their coming out, that you have done to the others; omitting only the tying of the Teeth, which would be superfluous here.

Note, that every thing is not capable of the same perfection, and that as there is no rule without some exception; so when I have asserted such and such things to be improvable to such a degree, it is to be understood for the most part, and in general; not denying but that it may happen otherwise in some particular cases: but I shall always deal candidly with every body, never undertaking any thing but what I shall be able to do according to agreement. And if any one will be pleased to come to my Chamber, he may have my Advice (concerning any thing that belongs to my Profession) *gratis* at any time.

Having given the readers the full contents of the first part of Allen's work, I will refrain from reviewing or passing comment thereon, though the temptation be ever so great.

Evidence That This is the First and Not the Second English Dental Publication

In the "Epistle Dedicatory" already mentioned, I have called attention to the fact that Allen therein states, on page 4: "which I had of offering you this first Essay of mine". He further confirms this on page 44:

Advertisement to the Readers

Gentlemen,

Although I have offered nothing in this Paper, but what is according to my own Experience, and the best of my knowledge; yet I will not say but that I have been deficient in many things, and have committed a great many Errors in the management of my Subject; but if you consider that I am the first (as far as I know) that ever wrote any thing of this nature; and withal, what is to be expected from one in my Circumstances, I hope you will be the more ready to excuse my faults. However, if what I have done be acceptable to you, I intend in a second Impression of this small Treatise to Correct, Illustrate, and augment it, to its fullest proportion. In the meanwhile I would advise you, to make use of what is here presented you, by

Your very Humble Servant,

Charles Allen.

We are thus definitely assured that Allen's "Curious Observations, etc." was the first work and "The Operator for the Teeth" the second to be published and that his first must have been favorably received, for, as he states:

If what I have done be acceptable to you, I intend in a second impression of this small treatise, to correct, illustrate and augment it, to its full proportion.

It is unfortunate that this work has so long remained a mystery and these errors have repeatedly been copied and recopied. Even Trueman in his recent remarkable article on "History of Dental Periodical Literature, in the English Language from 1839-1875" just published in the Index of Dental Periodicals, 1923, places Allen's works in the reverse order and further states, on page XXVI: "The first dental book in the English language recorded in dental bibliography is dated Dublin, 1687.

This is a quarto, by Charles Allen, 'Operature for the teeth,' a title assumed by dentists of that period, later supplanted by Surgeon Dentist. There is another noted, of the same date and size, published in London, entitled 'Curious Observations on the Part of Surgery Relating to the Teeth'. We know very little about these; it is probable they may be different imprints of the same work."

Summary

Had a copy of this treatise ever been in the hands of, or seen by, a dental practitioner, it seems hardly probable that it would have taken 236 years to learn the name of the author, the correct title, the position, so far as priority in sequence is concerned, and the place of publication of the first dental work in English.

It is surprising and indeed a curious fact that it has taken all these years definitely to establish who wrote and which was the first English dental work, as well as to correct the errors found in all of the dental bibliographies so far published.

For some unknown reason, none of the dental histories so far written mentions anything regarding Allen or his two dissertations. This is rather astonishing when all of them considered the first works published in every country except England. The only explanation that can be offered is that the copy recently acquired happens to be the only one known and must have been hidden all these years in some obscure corner in the library of some unknown collector.

All dental and medical bibliographies heretofore have erred in placing the second paper of Allen's "Operator for the teeth" as the first, and "Curious Observations, etc." by an anonymous author, as the second.

We now have definite proof that the first English dental publication was written by Charles Allen in Dublyn, printed in the year 1686 and published and sold in London in 1687.

His "Advertisement to the Readers" confirms the "Epistle Dedicatory" as to which was the first work he wrote, as well as that he was "the first, as far as I know, (and by this he undoubtedly refers to English publications) that ever wrote anything of this nature."

From his introduction in the "Proem" we are lead to presume that he also was the first English dental practitioner, at least so far known, for he states, "of what importance it is to all men to be informed of those benefits which by MY ART they may enjoy," also, in Sect. 1, "And therefore being about to treat of My Art."

As today our keynote is prevention, so we also learn from Allen that such was the case nearly two and a half centuries ago.

Of what utility this undertaking of mine may be to every body, will appear by the sequel of this discourse, whereof the scope is to prevent the loss of TEETH,—In a word the—want of them, is as great a deformity, and of as much prejudice to one, as any thing whatsoever can be.

COOPERATION OF THE AMERICAN DENTAL ASSOCIATION IN CONNECTION WITH THE ADVANCEMENT OF DENTAL EDUCATION

By OTTO U. KING, D.D.S., F.A.C.D., Chicago, Illinois

(Read before the American Association of Dental Schools, Chicago, Illinois, March, 1924)

THE officers and the members of the House of Delegates of the American Dental Association, as well as all others who are leaders in the dental profession, are constantly making decisions that will have an important bearing on whether dentistry will stand still or progress.

The House of Delegates is a huge melting pot and a great forum where, after thorough discussion, vital decisions are rendered which determine the policy of the profession. The American Dental Association has ever served as the lawgiver and champion for the highest type of dental service and research.

For some time this great organization of 34,000 active members has been face to face with a real challenge—a challenge for a more comprehensive program, which of course assures substantial progress that could be made possible only by an increase in dues.

In order that we may have the right perspective regarding the advancement of dentistry in the United States, I shall present a few concrete facts from the history of our Association, gleaned from its Transactions. This will support our opinion that the American Dental Association has an historical background of achievement in the field of dental education. It also demonstrates that out of discussions and resolutions passed by the parent body have come forth collateral branches of educational organizations that have rendered and are still rendering yoeman's services for American dentistry.

Our Association laid the foundation of its greatness in the principles incorporated in its first convention, which met at Niagara Falls, Aug. 3, 1859.

The first constitution and by-laws provided for a committee on dental education and dental literature.

At this first convention, the following resolution was passed:

Resolved, That this Association recommend to all dental practitioners throughout the Union the propriety of urging all students under their tuition to prosecute a collegiate dental education.

Dr. James Taylor, chairman on education, in his report of 1865, says:

"Our dental association has done much to awaken an interest on the subject of education. The peculiar condition of our profession, just in its developmental stage, needed more than anything else the bringing of the profession together, that views might be compared, that different modes of practice might be critically examined, the results looked at, and the most efficient adopted.

"It is not too much to say that every meeting of the profession in an associated capacity has been a mighty power, dispelling ignorance, removing prejudice

and helping on the great work of general enlightenment."

Dr. W. H. Morgan, in an address in 1874, said:

"If we adopt some plan to get the dentists of the country in general into connection with our Association, it will be one of the means by which we may remedy some of the defects in our education."

Educational Qualifications

The constitution and by-laws of the American Dental Association were amended at the meeting in 1875 so that "no one can serve as a delegate who shall, after this date, enter the profession without first being graduated from some reputable dental or medical college."

In studying the Transactions of the American Dental Association, one is continually being impressed with the three golden threads running through the entire sixty-six years of its history, namely, interest in dental education, literature and organization.

J. Foster Flagg, in his address before the Association in 1875, epitomizes his beautiful essay on dental education by saying:

"Our colleges, our journals, our association should all have our good words and deeds. Our claim should be that individual *esprit de corps* which must result in never ceasing progress.

"We must try to cultivate unity of purpose. We must try to maintain ever in view the pathway we have thus far so prosperously trodden."

Dr. Thomas Fillebrown, who was president of that historical gathering of the leaders in dentistry at Old Point Comfort, August, 1897, said:

"Organization is essential to the success of any movement in which the combined effort of several individuals is desired.

"It converts the irresponsible mob into the disciplined and responsible army. It is the flywheel of progress which gives balance to combined effort, brings up and pushes forward the laggard of conservatism, restrains the erratic flight of the too exuberant enthusiasm of the reformer, gives steadiness to action, and makes advancement sure.

"An association of persons for the promotion of scientific investigation is but a small municipality, and demands the same organization for its successful advancement.

"The value of the professional organization today is not simply bringing together the great, the good, and the wise to exchange congratulations on what the few know more than the many, but in order that the many may meet the few and that knowledge, culture, and refinement and a true professional spirit may be more widely diffused and better appreciated.

"The time is past when a self-constituted few can gather together and bid the masses behold, admire, respect and obey the great 'We are.' No select few are now enough greater than the many to compel any such homage."

Dr. H. H. Smith, in his report in 1882, gives due credit to the American Dental Association in creating and directing professional sentiment, and in enlightening the people in regard to the necessity of thorough special training on the part of those who are to be dentists.

Dr. C. N. Peirce, who served for many years as chairman of the committee on dental education, makes a report in 1883 for his committee, which gave life to the National Board of Dental Examiners, as shown by the following resolutions passed at that session:

Resolved, That this National Association of State Boards of Examiners enjoin its members not to accept the diploma from any college which does not require two full regular courses of lectures, or its equivalent, one full course and five years' practice, previous to granting such degree.

Resolved, That this Association insist that boards now connected with this body shall not confer degrees or titles of any nature.

Resolved, That this Association recommend to the state societies of all states where no law exists the necessity of an immediate effort for such legislation.

The following resolution was also adopted:

Resolved, That the interests of the profession and advanced dental education both demand that all dental educational institutions shall require that every student, before being admitted to examination for the degree of doctor or master of dental surgery, shall have taken two full courses of lectures or its equivalent.

Dr. W. W. Allport, in his report in 1887, said:

"From its first meeting down to the present time, the American Dental Association has been instrumental in encouraging our dental colleges to establish a high standard of preliminary education as a requisition to matriculation, with a broad and comprehensive curriculum of study as a necessary qualification for conferring the doctorate degree in dental surgery."

In the 1907 Transactions of the American Dental Association, we note a communication that was received from the National Association of Dental Examiners and the National Association of Dental Faculties, suggesting the passing of resolutions appointing a committee for the purpose of establishing the Dental Educational Council of America. The committee was appointed and this Council held its first meeting in Old Point Comfort in 1909.

Financial Facts

Our Association has contributed, since 1915, $9,600 to the Dental Educational Council of America. It has also appropriated to the Dental Index, from its various funds, during the last four years, including 1924, $12,000. Since 1917 we have contributed to the maintenance of the Research Institute and the Research Commission $91,864.50. Without the tremendous influence of the American Dental Association, the dental profession would have served during our great World War in the trenches and our dental schools would probably have been closed.

It seems to me that this background proves conclusively that the American Dental Association has not only been the parent body, but has at all times enthusiastically cooperated in the establishment and maintenance of all the agencies that have had to do with the advancement of dental education, dental literature and dental organization in North America.

No one can study our record as revealed in the Transactions of the Association without realizing that the profession of dentistry in this generation owes a debt of gratitude which can never be repaid to the men who did the pioneer work and made possible the progress of evolution, which has produced the institution now comprised by the two words "American dentistry."

Visualizing our Future

Upon this solid foundation of accomplishment, we hope to be able to visualize a practical spirit of cooperation that will excel our past record.

Planning Ahead

The most important factor in planning ahead in the United States is that the country has never yet reached the point where it has stopped growing. At the time of the panic in 1873 the population of the United States was about 37,000,000. In 1900, however, it had increased to a total of 76,000,000, a gain of 39,000,000 in twenty-seven years. We now have thirty-seven persons per square mile, as compared with only twelve two generations ago. Despite this increase of over 100 per cent in population in so

short a time and the tremendous growth of dental educational institutions and the large number of graduates, our country has never had enough dentists to supply the public need and that demand is greater today than ever before in our history.

Wanted—Future Industrial Leaders

The industrial leaders are today manifesting a great deal of wisdom in planning for enough scientific leaders to meet the demands of 1930. The following quotation taken from a report of the National Industrial Conference Board is probably analogous to the public need for future dentists:

"Spurred by the fact that the need of big business in the United States for training young men to become leaders has far surpassed the ability of the nation's technical schools to graduate men of this caliber, a committee of eminent industrialists and educators held a series of conferences in New York to seek a remedy for the difficulty. They were confronted by the little-understood necessity of filling, by 1930, at least 200,000 new positions of responsibility in industry, whereas there are available in the technical schools at present only about 50,000 students."

This National Industrial Conference Board recommends, among other things, the following: 1. The preparatory schools can perform a great service to industry as well as to the students by properly evaluating the advantages of an engineering course and guiding toward the engineering schools the boys who have or in whom can be developed an interest in producing things. 2. Close coordination of educational effort is therefore necessary between industrialists and educators.

Questionnaire Survey

In order to secure practical suggestions for this presentation, I addressed a letter to forty-six prominent dentists in North America.

Brief excerpts taken from a very few of the many replies received in this survey will help us to diagnose our educational disease; thus, probably, by the use of every available means of analysis we may all be in a better position to help prescribe a rational method of treatment.

I am reminded by reputable physicians that health is sufficiently important to be made the object of careful, scientific study; that diseases should be diagnosed by the use of every available means of analysis; that treatment should have some suitable connection with the conditions discovered in the diagnosis, and that any medicine prescribed should fit into this treatment in a rational way. A patent medicine fulfils none of those conditions. A patent medicine vendor pays little heed to the general health situation, to community evils, to insanitary conditions, to the air we breathe or the water we drink. A patent medicine is above all such trifles. It needs to meet the test of no diagnosis. It is a "medicine-in-general" which proposes to cure "disease-in-general" and to bring about a state of "health-in-general." And it can point to some cures!

Now, on the other hand, there are those who insist that education is altogether as important as health; that if health is worthy of careful scientific study, education is equally worthy of the same sort of study and of painstaking analysis.

In order that I may not embarrass anyone, and for the sake of brevity, without naming the authors, I will read the following excerpts from some of these letters:

"From an experience of a quarter of a century in teaching, I am led to believe it is hardly possible to make good dentists out of medical men. It is an error, in my opinion, to suppose that we can begin a practical education at the top, when

a man has to acquire an education of the fingers as well as an education of the mind.

"The thoroughly qualified man in any profession is the one who is thoroughly grounded in the fundamentals. We have confidence in the physician or lawyer or theologian who, by a long course of study or training, has become well educated and learned in the fundamental principles of his profession."

"I would suggest that the scientific program of at least the next two or three annual meetings of the American Dental Association be largely devoted to the consideration of the subject of dental education."

"Too long has this most difficult and vital problem been left by us to the whims of theorists, and without a serious concerted attempt at its solution by the profession itself through its principal organized body."

"The American Dental Association can be of great service to dental education by assisting the Dental Educational Council of America financially more liberally than it has in the past and it can be of real service in urging its members to take a more active interest in the appointments on state boards."

"See to it that the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION gives more space to dental education in order that the profession, as a whole, may be kept fully informed."

"The American Dental Association should assume some responsibility for the organization and promotion of graduate study. It should be practical for a group of men in certain localities to get a teacher on most any subject, to help them study."

"Fads and new theories have no place in a college curriculum. I find that the majority of dentists today have the big idea of how to get the money and not how best to serve the people."

"Dental education for the laity has been sadly neglected. The American Dental Association has been derelict in its duty in educating the public."

"The American Dental Association, which is the representative body of the whole dental profession in this country, is the proper organization to establish all standards in dental education and in dental practice. If the profession of dentistry itself is not competent to set these standards, who in the name of heaven is competent to do so?"

"The man who is qualified to practice in one state should be equally qualified to practice in a neighboring or foreign state. Therefore, we should establish a standard of dental teaching which would be acceptable to the boards of dental education in the individual states."

"I believe that the Association will, in time, be called upon actually to protect the 'average' of us from the wild-eyed radical. If the Association can help put a stop to a lot of fellows who are the self-elected teachers of all sorts of 'special' courses, it will be a wonderful boon."

"The American Dental Association should keep the practitioner stimulated to better dentistry."

"In my opinion, too much that is not dentistry has crept into the dental curriculum."

"It seems that almost all of the schools, including some prominent university schools, like many in practice, give more consideration to the fees than they should."

"The council should be supported financially entirely by the American Dental Association in order to avoid among other things the possible embarrassments that might arise from reinspections when the expense of the committees are paid by the schools."

"A full-time paid secretary should be employed in this work and he should have his office in the headquarters of the American Dental Association."

"All organizations should enter into a campaign to secure adequate endowments

for the immediate establishment of research efforts at least 100 times as comprehensive as those in existence at this time in every dental school."

"There should be an all-time official who shall be required to make inspections, assist schools by his council, receive and investigate complaints, and make an annual report to the American Dental Association. The man selected should be a qualified dentist. The so-called postgraduate courses given by dental salesmen and dentists who are unqualified to speak authoritatively should be discontinued."

"The American Dental Association is in a position to suggest proper standards for preliminary qualifications to meet the demand of the public. We must not confuse the demands of the public with the demands of the educators. The public has every right to receive service, and inasmuch as it is paying the bills, it has some choice in what its demands should be."

"Custer was killed because he got so far ahead of the rest of the expedition that the Indians annihilated his command before the rear guard could catch up. The fact that he did it in direct disobedience of orders does not cut any figure now. Some today are getting the cart too far ahead of the horse, so to speak. There will be a reaction; such a program may mean suicide."

"Nobody knows better than you that the average of the march of the whole profession will not be the advance made by the advance guard, but it will be determined very largely by how fast you can bring up the rear guard.

"One of the great problems that we have to solve is to teach the dentists to render good service for moderate fees, such as the average American can pay, and still enable the dentists to live comfortably in the present and save enough for a competency for old age."

"Insist or demand that the various state dental societies have laws passed so that the boards can refuse to examine the graduates of Class C schools."

"The state boards of dental examiners should adopt rules which will conform to the standard of curriculum and rules which have been adopted by the Dental Educational Council of America, particularly as they refer to the questions of preliminary entrance qualifications."

"The American Dental Association can, by its influence with the Faculties' Association and the state boards, bring about legislation for a standard dental law in all the states."

The Tail Should Not Wag the Dog

In our plan of organization with its many subsidiary branches, the tail should never be permitted to wag the dog. If any individual, group or society has a grist to grind, it should be taken to the mill, as represented in our House of Delegates, the supreme body of the American Dental Association, for out of it should come forth the real issues that should establish our policy. And because of its tremendous force, as represented in its 34,000 active members, it should carry its program into successful operation.

Summing Up the Suggestions

The suggestions contained in these letters touch some of the inflamed spots which need some specific remedy. They also offer many constructive suggestions which we cannot hope to discuss in this paper. However, in summing up, it would seem that we need, first, to work out a more definite program, so that all groups may know the objective toward which we are headed; then we shall arrive at our destination. Second, we must realize that it is highly important for us to have frequently presented, complete information concerning the best methods of reaching our goal, for, after all, the marshalling of several phases of a profession or a business into one coherent and consistent policy is like moving the

various units of an army to a common end. You will recall that without coordination, without a supreme command at the beginning, the Allies had the fiasco of Antwerp and the tragedy of Gallipoli, not to mention many others.

The dental educational problem must be focused to one purpose by a central representative body—the American Dental Association.

With this historical background and the survey, how can the American Dental Association continue to cooperate for the advancement of dental education?

From my viewpoint, there are four groups who are vitally interested in this educational problem: (1) the dental profession as represented in our present membership—the dentists of today; (2) that group of students who are to be the dentists of tomorrow; (3) that group of dentists who have rendered pioneer service in dentistry, and (4) the public, whose best interests we are to take care of through these groups.

Cooperate With the Dentists of Today

Our plan of organization is so democratic in its nature and so thoroughly organized that it reaches nearly every man in the profession. Therefore, such a representative body of active members must be kept in constant touch with all of those agencies and plans that will raise the status of the dental profession and render greater service to humanity.

Our Own Journal

I feel that the greatest accomplishment during the last eleven years has been the successful establishment of a real dental journal which is owned and controlled by the dental profession.

The Secretary's report to the House of Delegates at the last annual session shows that the $1.00 dues which it appropriated in our budget to THE JOURNAL gave us $32,683.02, and from the advertising and miscellaneous departments we received $80,013.19, which made a total income of $112,696.12 for THE JOURNAL, and this entire amount, with the exception of $1,020.38, was turned back to the profession in the way of dental literature.

In other words, we expended nearly $112,000 last year to present to our membership a practical and scientific monthly publication. This journal cost each member for a single copy, a fraction over 8 cents, while the total cost to the Association for each copy was 29 cents.

The real mirror in our profession that reflects progress is the dental magazine. One of the greatest factors in the advance of dentistry and in giving to it a professional foundation has been the dental journal. Prior to it, dentistry was a trade. The profession of dentistry had its beginning in the foundation of the dental journal, as it presented to the earnest practitioner from its inception a medium for the exchange of thought and experience.

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION to be representative of the profession must be the mouthpiece for many societies, including the Dental Educational Council of America, the National Association of Dental Examiners and the American Association of Dental Schools, as well as the American Dental Association.

Research Commission

The American Dental Association has a very vital contact with the student, the professional man and the scientist through research grants to dental institutions. From voluntary contributions last year which in some states were paid as dues, we received a total of $26,484.50, and the Research Commission of the American Dental Association approved grants appropriating $26,300.

The work of the Research Commission since its organization in 1913 has ac-

cented and encouraged the scientific atmosphere throughout the dental profession and the dental college, which has already proved and will continue to prove of inestimable value for the establishing of a more scientific profession and demonstrating the necessity for large endowments for dental research work.

The passing of the amendment increasing the dues of the American Dental Association has added permanency to this fund, for hereafter it will not be a voluntary contribution, but will be included as a part of our annual membership dues, and we are thus assured of a stated amount each year. Approximately $6,000 annually from rental of the Research Institute at Cleveland, Ohio, will soon be available, so that a minimum estimate of the amount the American Dental Association will have annually for research work will be over $26,000.

Library

During the coming year, our Association, from its dues, will have a budget of approximately $10,000 for a library. Through this department the American Dental Association will be able to cooperate particularly with the dental student and the practicing dentist, as well as the research worker, for the plans that will be brought to fruition for the expenditure of this sum will undoubtedly give encouragement and practical help in the building of libraries in every dental school in the United States and the establishing of dental libraries in great centers, so that a permanency may be assured for dental literature.

The dental literature of the world should be indexed through this department, probably in English, Spanish, French and German, and should be published quarterly or semi-annually and furnished to our membership without additional expense. This will make all dental literature immediately available, a service that is necessary to those interested in preparing original papers and particularly for research workers.

The American Dental Association already has established a national library of approximately 3,000 bound volumes. This library has been catalogued, the work having been done by an expert librarian. There are approximately fifty complete files of various dental journals bound, together with many incomplete magazines, available reference books, reprints, pamphlets, etc.

The headquarters of our Association should maintain an exchange which can easily function as the clearing house for the building of dental libraries. This department should also assist in building a dental museum. We are constantly receiving offers from members of our Association to furnish material for a museum, providing they know that it is going to be a permanent institution.

No one will question the value of dental libraries, for it is the desire to come into personal possession of the intellectual heritage of a profession that brings together groups of learned men. This heritage is transmitted to us by the treasures of art and literature preserved in museums and libraries. A library exists for the purpose of preserving, disseminating and increasing the knowledge of a profession. All courses of study have an historical background.

William Allen White, in discussing the educational service that can be rendered by a library, recently said:

"There must be some way to eradicate the ignorance, some way to continue the educational growth of an American citizen, and there is a way—the way is through the library. It is America's continuation school. It is the most democratic of America's educational institutions. If the schools would only teach the reading habit, the library would educate the world."

I know of no method whereby a dental school can render greater service to a student than to create through the service of an efficient dental library the habit of study. A student needs this for his seminar and reference work, so that in the school he builds a foundation of study and research that will follow him throughout his professional career.

On the authoritative statements of William Allen Pusey, president-elect of the American Medical Association, that organization through its library has charge primarily of the bibliography of the world's medical literature. It stands ready to do, and actually does do, for a considerable number of the members of the Association, two very useful things: (1) It furnishes lists of references on any subject, or subjects, in medicine to any member on request. (2) It lends to its members, on request, for a limited time and on the payment of postage, foreign medical journals. The American College of Surgeons performs the same service for its Fellows, maintaining a staff of abstractors, translators and editors to assist the literary man in preparing his paper for publication.

These two services supplement each other; by the first one learns where to find the subject one is looking for; by the other one is helped to obtain the journals which are likely otherwise to be inaccessible. The American Medical Association is employing seven all-time librarians and assistants in this department.

An officer of the American Medical Association recently said to me: "Our quarterly cumulative index is of great assistance to any busy physician who is interested in knowing what is going on in his profession, and because of its completeness, and the wide field which it covers, it is almost invaluable."

Through such a library department in our Association, the dentist who is in active practice should be stimulated to continue his educational development by having prepared for him and published each month, in a department of the Journal, a review of dental literature which is constantly appearing in at least four different languages.

The American Medical Association is devoting 3,000 square feet to their library in their headquarters in Chicago.

Our own organization has not worked cut a definite program relative to a library, but I am sure that if the Board of Trustees and the House of Delegates find after a period of five years, that the material we have collected, including books, needs housing facilities that we do not possess and probably might be unable to finance, arrangements could be made to follow the plan of the American Medical Association, and turn over our museum and library to our large museums and public libraries of Chicago.

To carry on this work properly would require at least three people. I base this statement on information that I have rereceived from others who have been actually engaged in the indexing work in various languages.

Dr. Andres G. Weber of Havana, Cuba, has indexed dental literature in twenty different languages. In fact, he has done a tremendous amount of work in the field of dental indexing covering every phase of dentistry in these twenty different languages since prehistoric time.

Dr. Weber has all of this material in classified and indexed volumes, and this is available for publication completed to date each month.

Dr. Robert Lindsay, secretary of the British Dental Association, informs me that their association is building a national library. This is also confirmed in a recent lengthy editorial in the British Dental Journal.

Present Profession

The dentist who has graduated should be stimulated to continue his educational developments by accepting or doing post-

graduate work in acceptable dental institutions. In the main, this would mean the present dental schools conducted along lines approved by the Association of Dental Schools, also the American Dental Association, providing the Dental Educational Council sees fit to deal with the question of postgraduate work.

THE JOURNAL should at all times serve as a mouthpiece for the profession and also a real daily textbook for the student and practitioner.

Our JOURNAL has been a source of inspiration and direction for the members of the profession. Every man in the profession has had to get not only scientific training through the dental magazine, but also a certain amount of technical training, and has had the opportunity to become informed as to what is going on in dental education and legislation. Every dentist must learn something daily or he is going backward.

RELIEF FUND

Through the relief fund work, the American Dental Association has a unique method of keeping in close, practical touch with the pioneer dentist who through some misfortune finds that he is suffering and in want.

We have in this permanent endowment, at the present time, approximately $115,000. We shall also receive an amount from the increase in dues that will make available $30,000 for relief purposes in 1924.

The creation of these funds has brought and will continue to bring to our organization a spirit of brotherhood that adds much to the solidarity of our profession.

Let us remember that the child should never forget the heritage and legacy he has received from his father. Pioneers who have done noble work and made the dentistry that we are enjoying today possible should never be permitted to suffer.

THE DENTAL EDUCATIONAL PROGRAM

The report of the Dental Educational Council to the House of Delegates at the Cleveland meeting, stated: "It is apparent that the Council's position in matters pertaining to dental education has become stabilized and is permanent. To maintain this stability and permanency, a definite annual appropriation should be made by the American Dental Association and sufficient funds should be available to promote effectively the work of the Council. The Council should not be dependent upon the generosity of examining boards and the schools."

The amendment increasing the dues of the American Dental Association provides for one-third of the $2.00 increase to be appropriated to dental education. This automatically provides a minimum fund, based on our present membership, of $20,000 annually.

In securing data for this paper, I made several visits to the headquarters of the American Medical Association, interviewed their officers and secured the following information relative to the workings of their council, which undoubtedly will visualize to us a constructive program for our future guidance.

COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

The Council on Medical Education of the American Medical Association began its work by accumulating information concerning medical schools. It has gone to the point where it has accumulated: (1) almost complete information on the subject of medical schools, and (2) a complete file of individual information concerning all of the licensed physicians of the United States and of medical students, etc.

All of this information is available, on application, to the members of the association. Specifically, their council is ready, in order to serve their members:

(1) to give information concerning the laws and board rulings on medical education, licensure and reciprocity throughout the United States and in other civilized countries; (2) to give the ratings of medical schools and specific information bearing on the choice of medical schools; (3) to give the ratings and specific information bearing on the choice of postgraduate medical schools; (4) to furnish statistics on medical education; (5) to furnish statistics on the supply and distribution of physicians and information in regard to excess or lack of physicians in any particular locality; (6) to furnish information concerning dispensaries and group clinics and their problems, and (7) to furnish information concerning medical cults and miscellaneous and irregular medical schools.

The mass of information available to the medical profession, and to the public at the office of the American Medical Association is a storehouse of knowledge ready for the asking; it is, in fact very much like an unabridged dictionary. Dr. Caldwell advised me that his department last year received an appropriation of over $23,000.

The American Dental Association should duplicate the work done by the American Medical Association; it should collect information and have it filed in its central office where it would be available at all times for the dental profession. To illustrate:

1. There should be a list from the Dental Educational Council of all graduates of all institutions which this body recognizes. This information should come direct from the Dental Educational Council. Such information will help in the compilation of a dental history of each member and this material will be available at all times for state boards and others.

2. There should be a complete report from the Dental Educational Council regarding the classification of dental schools. An annual report of the council should be prepared in reprint form for free distribution to the hundreds of inquiries being received in our office at the present time.

3. The American Medical Association, under the supervision of their Council on Education, has prepared a booklet on "Choice of a Medical School." These are for free distribution and the association makes a special effort to distribute these to seniors in high schools, in an effort to stimulate an interest in medicine, and also to assist the prospective student in selecting a school. Here is a practical suggestion for us.

4. In the office of the American Dental Association there should be on constant file a report from the National Board of Dental Examiners. The dental examining board of each state should file a complete report annually showing the successes and failures of the dental school graduates at the various examinations.

Data referred to above will constitute basis information for a biographical index of dentists and for an American dental directory which will undoubtedly some day be maintained under the direction of the American Dental Association.

5. Copies of dental practice acts should be obtained and filed in our Association office. This material should be published verbatim in a directory. In fact, abstracts of these laws and rules formulated by the various boards regulating the registration of dentists should be published in a small book of laws at least once each year.

There is a great demand for codification of such laws regarding requirements regulating the practice of dentistry in this and foreign countries, particularly since there is so much discussion at the present time regarding reciprocity. Such a book would develop into an important "blue-

book", giving information in regard to standards of dental education and licensures.

If, in the opinion of the Dental Educational Council, it needs a full-time employe to assist in its work, the increase in the dues of the American Dental Association has provided an annual fund for educational work. The expense of inspecting dental schools, etc., should be financed by the members of the American Dental Association. This department should compile a record of the work done by the Dental Educational Council and the National Dental Examiners. These two boards are the guardians of the public.

Council on Mouth Hygiene and Public Instruction

The American Medical Association has a propaganda department that supplies regular press bulletins to approximately 5,000 daily newspapers each week. Its speakers' bureau during one year furnished 213 speakers for various meetings.

The propaganda department, in its report, says that it has distributed millions of copies of various leaflets and booklets to educate the public.

The American Medical Association has spent thousands of dollars in maintaining the organization necessary to support its educational work. Thousands of individual letters from laymen and physicians on various phases of health are being answered yearly without any cost. Illustrated public lectures are also available for this educational work, as well as a handbook of public health.

The Council on Mouth Hygiene and Public Instruction of the American Dental Association feels that it knows of no one movement from a health standpoint that would be more beneficial to the nation at large than a serious education campaign that would eliminate dental caries as far as possible. It has already provided sufficient data to convince it that every community sooner or later must adopt some plan, preferably one of prevention, to establish clean mouths and sound teeth for school children.

This department has supplied hundreds of reprints and has available motion picture reels which are in constant use. In fact, there has been such a demand for literature, lectures, slides, reels and other material for educational work, that our office has been unable to meet this demand.

We are continually being appealed to by educators, government bureaus and dentists to furnish information and assist in establishing all types of dental clinics.

The council has perfected a plan of organization that will include every state society, so that we may be able to carry on our propaganda work through a regular organized channel in each state.

Last year the trustees appropriated approximately $1,800 for this work. However, this department at the present time needs a large appropriation so that someone who is qualified, not necessarily a dentist, can be employed to establish, in the American Dental Association office in Chicago, a propaganda department, so that efficient service may be rendered in this very important work.

This council this year has asked that an appropriation of $3,500 be granted from the educational fund.

Summary

To recapitulate as to how the American Dental Association can cooperate for the advancement of dental education:

1. The American Dental Association must always be recognized in its relation to its branches as being a facsimile of the federal government, for our achievements have proved the value of this method of organization.

2. The American Dental Association will advance the cause of dental educa-

tion by reaching in a practical way through its JOURNAL, the four interested groups, namely, the pioneering dentist, the practitioner, the student and the layman. The present financial budget will make possible a practical application of a definite educational program: $26,000 annually for research; $20,000 for education; $10,000 for library; $30,000 for relief work; $30,000 for the annual session, and $120,000 for dental literature as represented in the monthly JOURNAL.

3. In the carrying out of a constructive program for the expenditure of these funds, it will be necessary to establish, probably, in the American Dental Association office, sufficient all-time help, duplicating, at least to some extent, the great work being done at the present time by the American Medical Association.

DISCUSSION

William A. Giffen, Detroit, Mich.: The condensed history of dental progress presented by Dr. King demonstrates that, during the past fifty years, cooperation of the varied dental interests is the fundamental principle upon which our achievements have been built. We certainly would be very foolish if we did not use our energy to encourage this cooperative spirit for the future. The past activities of our profession furnish the best evidence that we shall continue to organize, educate and achieve. Dental education has grown from zero to the place where it must be stabilized. This is the problem we are assembled to solve.

The House of Delegates amended the Constitution of the American Dental Association at Cleveland, and provided for a raise in our annual dues, of which approximately $20,000 is to go to the support of dental education.

The Dental Educational Council has made considerable progress as evidenced by their report on the classification of dental schools. In order to complete the proposed financial cooperation, all that is necessary is the presentation of a plan which will be acceptable to the Board of Trustees and the House of Delegates. No such plan has been submitted to the Association; therefore neither Dr. King nor I can officially suggest a plan.

I am going to offer a few tentative suggestions toward the formulation of a plan which I am convinced would be acceptable to our members. In passing, I wish to say that I interpret the invitation to discuss this problem in the light of an opportunity to put my personal views on record. It is a fair proposition which I am glad to accept as a duty. It must be distinctly understood that these suggestions have no official significance, and are to be considered simply as the opinion of a lay member of the American Dental Association, who believes this to be the most important problem confronting our profession at the present time.

A year ago, I returned home from your annual meeting at Omaha, after giving careful attention to all of the speakers perched on the three, five and seven steps of dental education, with three rather fixed ideas in my mind: First, that there is a woeful lack of balance between the practical and theoretical branches of teaching in our dental schools; second, that our dental schools are all underfinanced, and third, that dental education is being overpromoted. Up to the present time, I have found no reason for changing my opinion.

Now, under those conditions, how are you going to educate the dental profession to have, say, $20,000 worth of confidence in the Council each year?

First, remember that the war is over and the population of this country is growing at a rapid rate. The demand for dentistry is much greater than the supply.

Second, meet these conditions by formulating a selected preparatory course of your so-called high school and college subjects by simply cutting out those which in your judgment are least essential.

Third, eliminate from the dental curriculum that which is obsolete. Revise the textbooks, formulate a definite systematic plan for teaching all departments of the dental school and see that the teaching staff of each school works in coordination according to your specifications. Shorten the scientific courses, with the objective in mind that only fundamental principles and their application to the practice of dentistry are to be taught. Teach the students how to apply their knowledge in a scientific way to dental diagnosis, and keep pace with the great work being done by those interested especially in promoting preventive dentistry by instilling in the minds of the students, theoretically and practically, that the best dentistry possible should be performed for children during the stage of their development.

I believe that the Dental Educational Council will have to show that they have exhausted the present facilities and efficiency

of our dental schools before they can expect support toward adding another year to the dental curriculum. The tuition fees of students could be increased 100 per cent much easier than another year could be added, thereby insuring more teachers with a greater average of ability, as they would receive higher salaries, which, like the tuition fees, are at present too low. This would also place the schools on a better financial basis. In addition, the 3,000 students graduating each year would save, considering the increase in tuition fees, approximately $500 each, amounting to $1,500,000. They would also save a year's time, which in money earned and experience gained should amount to $1,500 each, or $4,500,000. The American people would receive a like amount of value in dental service for each year, or $4,500,000, making a total economic gain of $10,500,000. What would that mean to the welfare of the juvenile population of this country?

Fourth, formulate graduate extension work for schools equipped to carry on; a curriculum whereby those who wish to take advantage of further training along special lines and receive a special degree may do so; thereby eliminating those short demonstration courses given by our notorious experts, who simply stir up a muss and leave those who take their course imbued with the idea that they will be able to double their fees, because they have taken Dr. Raspberry's wonderful "Gunshot Prescription."

Fifth, show the profession and the public that the policy is fair, that the stronger schools made an honest effort to assist the weaker schools to raise their rating to the accepted standard before eliminating them, and a great work will be accomplished. Dental education will be farther ahead in twenty years.

Sixth, when this or a similar policy has been formulated I would suggest that, for the sake of economy, harmony and efficiency, the members of the Dental Educational Council submit their resignations to the Board of Trustees of the American Dental Association, with a recommendation that the Board appoint a man who is skilled in dental school investigation to devote his entire time as secretary and investigator, from the Association headquarters, also, a council or committee of five men in place of the present council; thereby establishing a participating committee subject to check or recall and eliminating the present interlocking directorate.

Thomas J. Barrett, Worcester, Mass.: Dr. King has not only given us his opinion as an authoritative speaker for the American Dental Association, but has also given to us the point of view of forty-six prominent dentists, and it is surprising to know how nearly in unison and in harmony they are. I have long held that the authoritative body to regulate standards is the American Dental Association, which is representative of all elements in dentistry. It is the organization whose membership is closest to the people. It speaks for every type of dentist, and, through the House of Delegates, every community with a dentist is represented. There you get the best thought, which, when sifted down, and with the agreement of the majority on the measure proposed, assures results that are representative of the people and of the profession. To confine the standards in dental education or in any other type of education to the direction of a few men is a mistake.

I have been a member of the Dental Educational Council for many years and was identified with those who created it. When we first made our appeal to the American Dental Association for funds with which to carry on the work of the Council, none of us thought that so prompt a response would be made. It is a source of encouragement to us to know that the profession does recognize the work we have done and that the Association stands ready to sponsor and to be responsible for our future existence without any financial worries or obligations on our part either to the schools or to the state boards.

I believe that the Council should be responsible to the representative body in dentistry and that we should make our reports to them, and I further believe that no radical change in the standards of dental education should be made without an expression from the American Dental Association. I am in favor of representative government and against any small body of men controlling and outlining our policies. I have always stood for that, and in our deliberations today and every day, while the varying standards of the different sections of the country were being considered, I have been at a loss at times to know what to do for certain sections. There are numerous states that are wealthy and maintain, at enormous expense, their great universities, and they can at any time assess their taxpayers to meet the needs of that community. But there are other communities not so well nurtured, but which are as important as those sections that are members of the wealthier states, and we owe it to them that this organization, through the delegates from that section, give due consideration to their needs.

Daniel H. Squire, Buffalo, N. Y.: In discussing in what manner the American Dental Association may assist dental education, I

wish to call attention to the simile which was drawn in the first paragraph of Dr. King's summary: "The American Dental Association must always be recognized in its relation to its branches, as being a facsimile of the federal government, for our achievements have proved the value of this method of organization."

The foundation which has made the Federal Constitution endure and led to its being considered the greatest instrument ever conceived by human intelligence is its application of the basic principle of freedom to every form of government, and our country will prosper and remain in its present state of integrity and power just so long as these fundamental rights of freedom are not curtailed or denied altogether by the enactment of laws which will modify the intent of this great principle.

The American Dental Association will likewise endure and remain an active force of tremendous value to dentistry just so long as it does not attempt to curtail or deny this principle of freedom, which is embodied in every form of educational endeavor and which must be worked out by each university in a way to meet best the needs of the community which it serves.

If the goal to higher dental education can be reached only by a prescribed path, there will be little incentive for the opening of other avenues of approach, and freedom of thought and action will give way to listless methods which lack initiative and enthusiastic cooperation. In the business world, men are chosen to prosecute certain lines of industry according to their experience, but in politics and education less attention should be given to platforms and curriculums and more to the way in which the intent of these standards are carried out, and, in any event, we should be governed by results in our estimation of educational worth.

The American Dental Association, while it may greatly assist in the regulation of dental education, should not attempt to dictate the policies of university work, which would rob it of its inspirational value and deny to these institutions that basic principle of freedom upon which they are founded and through which universities have enjoyed a constant development. The splendid work that has recently been completed by the Dental Educational Council in conjunction with the Carnegie Foundation will have a far-reaching effect on the present and future status of dentistry. Perhaps its greatest worth was felt in bringing to the attention of university executives the importance of dentistry in its relation to health service and the necessity for greater financial consideration in its development rather than in the formation of a new dental curriculum.

The lack of knowledge of the extent to which oral infections participate in the inception of systemic disease has changed the trend of the future practice of dentistry and simultaneously increased the demands for a higher type of health service. Such a condition could produce but one reaction, a universal appeal for a more comprehensive course in dental education. In the consideration of this problem there are three outstanding features presented: preparation, foundation and specialization.

Preparation is the precursor of efficiency, and the first two years of an arts and science course of study have a twofold value, cultural and disciplinary, most essential in the practice of a profession. Foundation always represents depth and breadth of intelligence, and with the basic training of medicine, the horizon of the dental view is increased to that of the medical, which offers an adequate foundation upon which any specialization may be undertaken. Specialization pertains to the two years of dental training, which contain some important changes; intensive methods in the teaching of dental technic, which constantly alternates with infirmary practice, giving the student a "close up" view of the relationship of the principles of dental technic to actual methods of practice; a more intimate contact with medical service through the ward work in the hospitals, and the opportunity which the student enjoys of advancing as rapidly as he is able.

The question of dental service for the masses as urged by the essayist is before us, and in working out the problem our reply should not in any way impede the progress of higher standards of dental education. The situation may be met, in my opinion, without any retrogressive movement. Dentistry is the most important branch of medicine and as such cannot longer be considered a sequestrum of the parent profession.

In meeting the problem of quantity in dental service, quality need not be sacrificed. Heretofore, we have not used our knowledge to the best advantage because, as a class of practitioners, we have attempted to handle the situation alone from the preventive, the reparative and the technical angles. It is neither economic nor essential to the quality of the service for the dentist to do all of the manual labor. He is capable of directing and supervising at least the preventive and the laboratory technic, and in so doing he will have the opportunity to serve a greater number of patients, and so will eventually be able to meet the emergency of inadequate dental serv-

ice. We have come to the high place in dentistry where university trained assistants must be a part of our office force. For the future of dentistry it is far better that we have the services of an educated assistant rather than of a dentist of mediocre ability.

If we are to meet the exigencies of daily practice, we must have the superlatively educated dental man to direct the work and the university educated dental hygienist and technician to assist him. With this unit, dental service will be at least twice as effective in meeting the present needs of health service.

The principal objection to higher dental education is apparently the question of time: many educators seem to feel that it is not worth while. It is quite universally conceded, however, that dentistry is the most valuable insurance against disease, as medicine is the most valuable aid when disease exists. Therefore, the importance of dentistry supersedes that of medicine from the point of view of prevention. This item of time as it is concerned in the six-year course of dentistry and medicine may be modified without changing the standard of the courses by increasing the length of each yearly term to ten months. There is much to be said in favor of this change: First, it would shorten the six-year course by one calendar year, making it five years; second the saving of a year's expense would offset the opportunity of earning an equivalent amount during the summer vacation; third, the continuity of courses, theoretical and technical, would be vastly improved and more productive; fourth, the goal of adequate dental service would be reached without lowering the standards of dental efficiency.

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION will be the avenue of communication between the dental educator and the practitioner, and its influence for intellectual achievement will be reflected in the progress of the profession and in its stimulation of regard for dental literature.

The establishment of departments of research in the universities by the American Dental Association would forge a strong link between these forces; and the universities are sorely in need of this assistance.

If we again apply the principle of the federal government to state board examinations, we find that, contrary to the idea of American independence, dental students are educated under state laws and then prohibited from applying the federal principle of freedom in the selection of a location in which to practice dentistry without a series of subsequent examinations. Isn't it desirable that the university courses should be so nearly parallel that the graduate body would be permitted to practice in any part of the United States? Then a final examination could be taken before a national board of dental examiners, and the dignity of the university degree of Doctor of Dental Surgery would be upheld. The scope of instruction is a bone of contention between these two governing bodies, and the dental graduate will not have a square deal until the examiner and the instructor can agree as to what shall constitute the dental requirement for practice. The fundamental principle in dental education should not be to prepare students to pass state board examinations.

Dr. King has emphasized the need for a training school for teachers of dentistry, and I am in hearty accord with this suggestion because teachers of dentistry include all those who are in any way connected with dental education. For the past three years, the school which I represent has had a course in pedagogy, and its influence on our faculty has surpassed our broadest estimate. We shall continue this course indefinitely because we feel that it is indispensable as long as we are members of a teaching body.

COOPERATION IN THE DENTAL OFFICE

By RUTH A. CARR, Chicago, Illinois

(Read before the North Side Branch of the Chicago Dental Society, December 3, 1923)*

WE are to discuss a subject of vital importance to us, and my purpose is to endeavor to bring about a more harmonious condition in the dental office. Cooperation is the cornerstone upon which we must build. Dentistry is a very precise calling, with an endless amount of detail, all of which makes each part of the work exacting and tremendously interesting.

There is no longer a question in the minds of the dental profession as to the necessity, in daily practice, of an efficient assistant. The public, too, has an attitude of acceptance toward her presence in the dental office, knowing that by her help the dentist can devote his entire energy to scientific service. Assuming, then, that there is a general agreement that the aid of an assistant is of vital importance and that she must be properly versed in her duties, the question in the mind of the dentist should be: What are my duties toward educating the assistant and maintaining the cooperation necessary to success? The definition for cooperation is working together. How many of you can honestly say that such a condition prevails in your office today? Those who can should be commended and rewarded, but should continue to bear in mind the necessity of maintaining this condition. To those whose answer is negative and who are doubtful as to the manner in which this end can be attained, I wish to offer a few suggestions, which, if they appeal to you as being of value, you may possibly take back to your office and work out advantageously.

"We get out of life just what we put into it." The best way to insure a perfect day is to be cheerful and useful, and fill each hour with sixty minutes of worthwhile effort. If we learn to enjoy our work—and this applies to the dentist as well as to the assistant—it becomes a a pleasure. One of the greatest obstacles to be overcome by us all is indifference. Anxiety to get away from the office, shirking one's duties, in other words, watching the clock, is a grave mistake. I do not mean that we should work all the time. No profession demands more relaxation in the way of proper outside amusement or diversion than the dental profession, because of the continual mental or physical strain. However, outside interests must be left outside the office door. The assistant owes such consideration to the dentist, and the dentist in turn owes it to his patient. Otherwise, office efficiency must suffer. Ask yourselves, not as a profession, but as individuals, whether you can enumerate the duties of your assistant, and if questioned, could you define your understanding of a

*This paper was also read before the Kenwood Branch of the Chicago Dental Society, February 5, 1924.

dental assistant? Someone has said: "She is the office accountant, the efficiency engineer, and the diplomat who stands between the dentist and wasted time." Dr. C. N. Johnson has written of her as having stepped in as a buffer between the dentist and a myriad petty distractions and annoyances inseparable from conducting a dental office. Others have designated her as a silent business partner. She has been the subject of many discussions, and is found to be the hostess, child's nurse, housekeeper, private secretary, bookkeeper, telephone operator, laboratory technician, anesthetist, as well as the girl who stands by your side at the chair endeavoring to anticipate all your wants. Thus, we meet her in the dental office of the large cities and the small towns. It has been said that she has the gift of human relationship. In her position money is not a mark of distinction, nor is position, yet she has the satisfaction of performing a good service: service to the dentist, to the profession and to the world at large. She is looking for the new thing, the thing that contributes to the comfort and pleasure of all, her knowledge being that no material or personal element in the office is so essential as good temper, cheerfulness and good health. To know her and find her in this capacity is fitting. Knowing that the caliber of your assistant is such, have you ever given much thought as to what her compensation should be? It is difficult to have one's mind wholly on one's work and be cheerful, when one is wondering how to make resources and liabilities balance. Do not get the impression that I am asking for greater financial returns for the assistant. I do not know the income of any assistant other than myself. I do know that it is something which depends entirely on her services, and the efficiency with which she cooperates. Give her what she is worth; if she feels she is worth more, it is up to her to meet the requirements and increase her efficiency. I am sure she will be rewarded accordingly. This is a subject that we should not have to discuss, and one that I do not like to enter into. However, we all know it is essential.

Perhaps some are saying, "My assistant does not come up to this standard, nor does she perform her duties in such a manner." Then ask yourself why. How many dentists, after securing an assistant of the type I have just described employ, aid and respect her as an assistant? She is only human and has to be instructed in her duties, and instructed with care. The dentist goes to school and spends several years in study and research work to acquire a knowledge of his profession. On entering practice, he continues to study and assimilate, deriving great benefit from the fellowship and interchanging of ideas and ideals with the members of the various dental societies to which he belongs. Yet we find this dentist expecting immediate and efficient results from an assistant who has received little or no instruction in dentistry.

No doubt every girl who accepts a position as a dental assistant is desirous of doing her work well, but many times they do not know where to begin, and, although willing to be of all the assistance possible, are at a loss as to what to do. They are handicapped because they do not receive instruction from their employers.

Perhaps the dentist himself is not aware of all the duties an assistant should perform, as well as, if not better than, himself, because she can devote more time to them. I believe if he puts the following questions to himself, he will be aided in developing a correct attitude toward his assistant, and be en-

lightened as to the manner in which she can be instructed. These questions are: "Am I patient and considerate? Do I devote the proper amount of time to instruct my assistant in her work? Is she working *with* me or *for* me? If not, why? Do I discuss my plans with my assistant, and by talking things over make them clearer to myself?"

In other words, how are we going to succeed, whatever our vocation may be, unless we cooperate, and unless we are willing to see the other fellow's side of things? We cannot crawl into a shell and expect to expand in any way. We must work together, share one another's ideas, and above all, in so doing, be trustworthy.

When these things have been accomplished, all that the dental profession stands for will advance higher up the ladder of success, and humanity's sufferings be decreased. Whenever the dentist has taken the time necessary to instruct properly an intelligent young woman in the duties of his office, he has found her services invaluable in maintaining the equilibrium of his practice. It is well to remember that an assistant is more or less a reflection of the man who hires her, and she should be chosen with that in mind.

Perhaps the assistant needs some incentive to enable her to become more interested in her work. What greater incentive could she have than the knowledge that the dentist is interested in her welfare—such interest being shown by an expression of appreciation. Praise is never wholly undeserved. No bonds were ever broken by appreciative remarks. One can hardly come in contact with any person without noticing some commendable thing.

I have given much thought toward determining the fundamental reason why my work as a dental assistant has been so interesting to me. I have been interested since the first day I entered the field, and my interest continues to increase. However, all credit for this interest cannot be given to myself. It is true I apply myself and try to fulfil at least a part of the requirements, and yet my part is so small compared with the kind, patient and thorough instruction being given me by the dentist with whom I am associated. I have found in him a true, staunch friend; and I have his welfare uppermost in mind, and am working with him to the best of my ability. The care he has taken to impart to me his knowledge of dentistry has been a great education, and continues to be so. Knowing and appreciating its value, I endeavor to use it well, and try to make him feel that his efforts on my behalf are worthwhile. I feel confident that there are many assistants whose attitude is similar to mine.

Today, we are fortunate to have installed in the curriculum of various universities of the country a course for the young woman desirous of becoming a dental assistant. The day is coming when the dentist can expect efficient results immediately on employing her, but until such time, we must practice patience and perseverence. Even when we have in our midst the graduate assistant, the need for cooperation will be as great as today. It is actual experience in any profession that brings the greatest knowledge and tends to increase that knowledge. We cannot cast our bread upon the water and expect it to come back in the form of a sponge cake tomorrow. All our knowledge and thought count little unless we act well. Many men when turned out as graduates in their profession, whatever it may be, have perhaps felt that they could do anything or face any problem in their line of work, only to realize, when the time came to fulfil certain duties, that they had much to learn. This

is proved by the fact that they are enabled to do things more scientifically by experience and by working in cooperation with others.

In making a few helpful suggestions to the assistant I hope to be of equal help to the dentist. First of all, let us ask the assistant a few questions. Are you, as an assistant, trying hard to please the doctor with whom you are associated, and using your own judgment in whatever you have to do? Are you exercising the proper amount of initiative in your work or are you going along in an automatic machine-like manner, never trying to improve your work? If the dentist is interested in the welfare of his patients, he desires your suggestions, and wants you to inform him of new and better ways of accomplishment. We are giving personal service, and the patient is the first consideration. The next consideration is the important factor of cleanliness, personal cleanliness on the part of both dentist and assistant. Clean, neat, well-fitting garments are a mark of self-respect. "No person can respect others who does not respect himself." The assistant must know what surgical cleanliness means, the necessity of proper sterilization, because of the possibility of transmission of disease through unclean instruments and appliances.

The discriminating and well-informed patient of today recognizes the importance not only of practical cleanliness, but also of surgical cleanliness. If the operator fails to obey the laws of cleanliness and asepsis, the patient loses the sense of security from infection that he has learned to look for, and to which he is entitled. The dentist may often be benefited by the assistant's sense of the fitness of things. Tactful suggestions from the assistant can perform miracles in improving the personal appearance of the busy dentist whose only thought is his work.

It is the assistant's duty to open the office in the morning and to see that every piece of furniture is clean and in its proper place. The next step is to open the windows and fill the room with fresh air so that patients coming in will feel comfortable. Always approach a patient with a smile and a pleasant greeting. The moment the patient arrives, he should be met and either escorted to the operating room or assured that the doctor will see him in a few moments. Patients are not there because they want to be, but because necessity demands it. They come burdened with fear, women (to say nothing of men) on the verge of nervous exhaustion, and children in tears. These conditions call for sincere sympathetic kindness from the assistant. Make the patients feel that you have a personal interest in them, by talking about the things with which they are connected and which are of special interest to them. Study the idiosyncrasies of the patient, and try to remember his special likes and dislikes. Always be sure to give this attention in a cheerful and polite manner—politeness, being true kindness, is a matter worthy of attention. This same courtesy and respect should be her attitude toward the dentist. She should always be obedient, even if in her judgment she feels it is not the thing to do. She must possess the art of aptness, which means to be quick of comprehension. She should also have the ability to look ahead.

The assistant should stand between the outer world and the operating room, and should be attentive to all the varying moods of the dentist and his patients. She must know the name, use and care of dental instruments. She must conserve the dentist's time by keeping a "call" list in case of failures to keep appointments.

The telephone is an integral part of business, and yet, if not handled properly is the greatest waster of time. When

the doctor is asked for, state that he is busy and cannot leave, and ask to take the message. If it is important that the one calling talk to the doctor personally, ask whether you may call back as soon as he is at leisure, being sure to keep a list of all calls, referring them to the doctor at an opportune time. To answer a call during an operation is not fair to the patient in the chair or to the operator. It is easy to give a wrong impression over the telephone, and the manner in which you talk to a person unseen is one of the best tests that can be applied to your intelligence and self-control.

Proper management means much in the dental office. A knowledge of business and personal correspondence is essential, and can be developed through experience. Buying supplies and keeping on hand an ample supply of materials and instruments is a very important duty. It is best to keep a reserve stock and replenish when low.

Dental assistants of today can fit themselves for many duties by applying themselves diligently. They can become of great help with the laboratory work; in fact, can assume all the responsibility. I am acquainted with many assistants here in Chicago who turn out full and partial dentures and fixed and removable bridgework that any dentist could well be proud of. This alone shows what can be accomplished if the dentist will give the necessary instruction.

We must be able to answer all questions intelligently. There is always a class of patients to be educated, and a competent assistant will be a great asset in making explanation when necessary. It has been found that in this work one need never have idle moments. There are many things to take up one's time, cutting gauze, making cotton rolls and applicators, swabs and sponges, also cuting guttapercha, and cleaning and rearranging supply cabinets. Unless an accountant is employed to take care of the business end of the office, the assistant should transact all financial affairs, such as handling all money, writing all checks, and giving credit and receipts for money received. She should have a system of bookkeeping the simpler the better, and send out statements at the proper time. She should receive and dismiss all patients who come to the office, letting only those who are entitled to consideration reach the doctor, thereby conserving every possible minute of the operator's time.

Cooperation between the dentist and assistant means efficiency in the office. It also allows the operator to conserve his nervous energy, to concentrate on the details of his work, and to put into effect some of the ideals which every man who practices dentistry should have. Without that cooperation, there is no efficiency.

In this city and other large cities of the country, the present-day dental assistant has had a vision—a vision that has carried her into the future, and awakened her to the fact that her work has just begun. This vision has induced her to form societies to carry on this work so nobly started. To appreciate and understand such movements, perhaps it will be well to view dentistry from the beginning as a profession. If we study dental history, we find that at one time the barber was the dentist and had no technical knowledge.

About the year 1839, a group of liberal minded men got together and formed the first dental college. Much opposition was shown to this by a large percentage of dentists of that day. Not long after that came the formation of dental societies. What was the purpose of these societies? The same purpose for which these societies are now being formed by the assistants—general advancement; the

development of greater achievement and efficiency and the establishment of higher standards in the practice of dentistry. The assistant's work makes her a part of one of the great healing professions, and her daily tasks require education and experience. I know of no better way that this can be accomplished than by the formation of such societies, and I am sure it marks a new era in the work of the dental assistant.

Just as the dentists back in 1839 showed opposition to the forming of a dental college, we now find a few men opposed to the assistants' societies. However, with the help of those who have been educated to realize what these assistants' societies are doing for the dentist, the assistant, and the general public, this opposition is being lived down.

It is difficult to explain to you at one given time all the possibilities along the lines I have touched on, but if you will only work out a few of them, you will aid in making the highest grade of skill possible. With true skill, time is saved, noise is replaced by silence, lost motion vanishes and confusion, with attending annoyance, disappears. We are in a large field for good, earnest and unselfish service. Let us all work together, with the right ideals, and carry on; for the wisest and most interesting men talk little, think much, complain never, but travel on.

Discussion

Beulah Thompson, Chicago, Illinois: Miss Carr has enumerated the various duties of the dental assistant and pointed out ways by which she can help the dentist increase his income or earning power. I wonder how many assistants give much thought and study to the figures that appear under the expense column. Are you interested in the dentist's gross or net income?

Have you studied the art of buying conservatively? Are you wasteful with materials such as cements, alloys, mercury and investing plasters? Are you careful with instruments and equipment? Do you watch the gas burners in the laboratory and avoid needless burning of lights? Are you extremely saving with gold filings and other precious metals? These matters may sound trivial, but it must be remembered that they contribute greatly to an increased net profit on your month's business.

Our monthly report shows the amount of earnings—cash received—and office expenses. It also gives these amounts for the same month of the previous year; and you may be sure that we are as anxious for our expense report to show up favorably as we are to show an increase in our month's business. Assistants, try submitting a report of this kind and see how interested you as well as your dentist will become in comparing these reports.

The dental assistant's indifference to her personal appearance, to the comforts of the patient, to her duties and to the "value" of the dentist's time and his wants, is, I think, one of the greatest obstacles she has to overcome.

When a young woman first enters a dental office to take up the duties of the dental assistant, she is either very enthusiastic over the endless detail work in a dental office or awed by it. To keep this interest and enthusiasm alive, the dentist should take time each day to instruct her properly in one or more of her duties, each day teaching her something new, thus adding to her store of knowledge, and if she is apt she will not have to be shown twice. If she continues to be indifferent to her various duties and office surroundings, it is more than likely that the dentist is wasting his time trying to teach her and the sooner he dismisses her the sooner harmony will be restored in the office.

To keep up one's interest and enthusiasm one must advance. No one worth while is satisfied with the amount of knowledge he or she has acquired, and this advancement can be accomplished only through the cooperation of the dentist.

As she learns from day to day her various duties, the assistant should start to systematize her work, trying to perform certain duties each day at a given time. "Systematizing work creates interest. Interest shown in one's duties promotes cooperation. Interest and cooperation produce harmony and where these qualities are evident, you will never find 'indifference.' "

Mary M. Hill, Chicago, Illinois: Miss Carr has embraced every angle of cooperation in a dental office. She has suggested methods

by which the dentist can bring out the best in his assistant and how the assistant, by application and alertness, can in turn make herself much more valuable to the man with whom she is associated. In an occupation which requires such close contact, what finer spirit could be sought?

Several of the points brought out by Miss Carr are of such importance that they will bear repetition. She has asked the doctor to question himself on these points:

Am I patient and considerate with my assistant?

Do I devote the proper amount of time to instruct her in her duties?

Is she working with me or for me?

Do I discuss plans and talk things over with her?

Many of us, I for one, have the good fortune to work for men who could give satisfactory answers to these questions. Doubtless every dentist will want to give satisfactory answers when he realizes the wisdom contained in the words: "Whenever a dentist has taken the time necessary to instruct properly an intelligent young woman in the duties of his office, he has found her services invaluable in maintaining the equilibrium of his practice." It is the duty of the assistant to ask the doctor to explain anything that is not clear to her and which he, through inadvertence, has failed to mention. If the dentist will discuss matters of office detail with his assistant, it will urge her on to better efforts and develop her initiative.

Another point is that of conserving the doctor's time. It should be the aim of the assistant to relieve him of details so he can give all his attention to his work. It is said that she is his third hand and that is demonstrated to the greatest extent in the assistance given him at the chair, in anticipating his needs. An assistant must never reveal by word or action that a mistake has been made by the doctor, and he should show the same courtesy to the assistant. She should never argue or express surprise at what may happen or suggest methods to the doctor before a patient. There should be team work, and the assistant must possess confidence in the dentist as a man and in his professional ability.

A third point considered is the matter of handling patients. Our manner of taking care of patients should always be sympathetic but not effusive, and we should be courteous at all times. Tact on the part of the assistant means so much to the atmosphere of an office. To greet patients cheerfully is all that is necessary unless they open a conversation. Gossip and slangy expressions should be avoided. Both doctor and assistant should be of few words.

Miss Carr warns the assistant against indifference. She should always put forth her best efforts and take as much interest in her work as she would if it were her own business, and not adopt the "that's good enough" attitude.

To summarize: An assistant, to cooperate with the dentist to the best of her ability, should know what constitutes an efficient dental assistant; practice patience and perseverance, and possess a good amount of common sense, personality, loyalty and dignity. She should read and interest herself in literature pertaining to her work and should follow the old adage that "Whatever is worth doing is worth doing well."

SOME THINGS TO BE CONSIDERED IN DETERMINING WHAT TEETH SHOULD BE EXTRACTED

By THOMAS L. GILMER, M.D., D.D.S., Sc.D., Chicago, Illinois

(Read before the Chicago Dental Society, October 16, 1923)

WHILE I have always recognized the evil influence which infected teeth, mouth and jaws exert on the body, I have not been so radical in my views as some of my colleagues although I have been more so than some others. Consequently, my position has not satisfied either of the extremists.

It is doubtful that anyone will soon be able to lay down a rule that will satisfactorily answer the question I am asked to answer: What teeth should be extracted? No hard and fast rule can be formulated to fit all cases, since conditions differ in individual patients. That which is a menace to one is not a menace to another; likewise, that which is not harmful to an individual at one time may be harmful to him at another. It is largely a matter of the resistance of the tissue cells to bacterial invasion; to increased virulence in the invading organism, or to something independent of either.

There are three distinct types of typical apical alveolar infection: the acute; the chronic with a sinus discharging through the gums or elsewhere, and the chronic without the sinus, usually called a blind abscess. In dealing with the latter, I have purposely omitted the word abscess, since it is not strictly speaking an abscess, but a periapical alveolar infection. An abscess is defined by the best authorities, as a localized collection of pus in a cavity in the body. Dr. Hatton's and my studies on this subject have demonstrated that blind apical infections are not usually purulent, and, therefore, are not abscesses. Since in infections of this class, pus is not present, the dentist who discovers from roentgenographic findings one or more apical infections of this type, misinforms his patients when he tells them that, as a result of such an infection they have pus circulating in their veins. Some nervous women who have been thus informed have been made almost hysterical, and as a result have earnestly requested the removal of all of their teeth, regardless of the nature and extent of the supposed infection.

I have also deleted the term granuloma, since the granulation tissue about the apex of an infected root is not a tumor in any sense. This diversion from the subject under consideration is justifiable only if it has a tendency to prevent incorrect and harmful statements.

Those who have had a wide clinical experience and who have carefully studied apical infections in their causative relation to secondary disease cannot ignore the fact that they do cause such disease and that the metastatic involvement is often far more serious than the primary focus. An insignificant furuncle in the skin, due to the staphylococcus, may, under favorable conditions such as lowered bodily resistance or increased virulence of the bacteria, cause an osteomyelitis or a serious heart lesion. If this is true, then, under similar conditions, chronic apical infections may cause

secondary disease in other parts of the body. On the other hand, a focus of infection in a remote part doubtless often causes apical alveolar infection as a secondary process. Pulps of teeth, having no cavities of decay, become infected and die, apical infection following. We can attribute this to no other source than some infection outside the jaws from which germs are brought to the teeth by means of the blood and lymph streams.

In attempting to answer the question: What teeth should be extracted, we will confine our discussion to two classes of diseased teeth, the periapically infected teeth and those involved in pyorrhea alveolaris.

We may first consider an extreme case of periapical infection. A patient has lost one eye; the other is involved in a serious iritis or other disease of metastatic origin, which threatens the loss of sight of the other eye. Careful examination of all parts of the body by competent specialists fails to reveal any focus other than a slight apical infection about one tooth. In such a case, I should unhesitatingly recommend the removal of that tooth, no matter how valuable it may be either for mastication or for the patient's appearance, since the value of one tooth, or many, is not to be compared with the value of the sight of the remaining eye. If neither eye had lost its sight, and under similar conditions, if disease threatened the loss of the sight of one, I should recommend removal of the tooth in this case also.

Let us consider still another condition which we have all seen. A patient is in perfect health, so far as can be determined. The teeth are examined by roentgen ray and it is found that two or more have dead pulp, with an infected zone extending crownwise nearly half the length of their roots. Here is a puzzling problem. Shall the teeth be treated or extracted? They are valuable; the patient's health is good. Roentgenograms seem to indicate complete filling in of the rarefied zones with bone following treatment of some such teeth, but it is extremely doubtful that the cementum is ever fully reproduced. Hatton and others have demonstrated that, in some cases, Nature is seemingly successful in her efforts to cap over denuded dead cementum. A somewhat analogous condition is found in the trunks of trees in which dead parts are completely covered over by wood of denser fiber, and the tree remains healthy and vigorous. But is the repair absolute or is the zone of reformed tissue about these teeth a weak spot, liable to reinfection? I doubt whether it is so nearly immune to infection when there has been such extensive injury as in the case just cited as it was prior to the death of the cementum and its immediate covering. If we could be certain that the patient would never be subjected to a condition which would lower his vitality, we should attempt to cure such teeth and if successful, we might let them remain as long as they are helpful in mastication. But we cannot be certain that the patient's resistance will always be high. The resistance of fowls, which under ordinary conditions are not susceptible to the anthrax bacillus, when subjected to unfavorable surroundings, such as improper feeding and being cooped in such a way that they stand in cold water, is lowered and they become susceptible to these bacteria. In all cases in which so much of the cementum and periodontal membrane have been destroyed, I believe we should recommend extraction.

On the other hand, if the tooth had only a small part of the periodontal membrane and cementum destroyed and the patient is in good physical condition, I believe treatment is indicated, provided the root canals are of such a nature that they may be properly filled. Nature is sometimes helped by resection of all of the dead part of the root when there has been considerable denudation of its apex. While the condition at the end of a resected root is not an ideal one, the root itself is in a better condition to be

capped over by Nature than when a considerable part of its dead apex is left intact. Resection is not indicated for the molars; therefore, its use is restricted. Resection for the cure of apical infection is not always successful, but I have been agreeably surprised to find that a large percentage of teeth thus treated often remain seemingly cured for many years; therefore, I believe it good practice in selected cases. The root canal should first be disinfected and filled and then resected. Resection affords perfect drainage and as completely cures the immediate condition as does extracting. Hatton, in the few cases that he has observed, found that resected roots had been covered over by a dense fibrous tissue and were apparently protected from reinfection. Hatton's findings have been verified by H. Euler, Gottingen.[1] Everyone has seen hypercementosis about the apex of pulpless teeth. This is probably due either to an irritant induced by an abnormal occlusal or other mechanical insult or to the irritating influence of a low grade infection, usually the latter. Sclerosis of the bone seen following cured or partially cured infection in the jaws is probably the result of overcalcification in the restorative process.

All pulpless teeth should be examined by roentgen ray twice yearly, in order that their condition may be observed.

It has been my privilege to have many ailing patients referred to me by physicians to determine their oral condition. I have kept records of all such patients and later have been able to check up on many of them. In some of these cases, there have been miraculous cures, following the elimination of jaw infections; while in other cases, there have not been cures but a marked improvement has resulted. In still others, there has been temporary improvement only, and in many there has been no benefit whatever.

The fact that we have not found removal of the source of jaw infection a panacea for the cure of all ills attributed to such infection does not lessen the significance of the established fact that the removal of these foci is often followed either by complete cure or by mitigation of symptoms which may be attributed to such an infection. The jaw infection may be only one of several foci of infection in the body, and in such a case, the load may be lightened by the elimination of the oral disease and the patient's condition improved, but a complete cure is not to be expected until the other infections have been eliminated.

It is much easier to locate foci of infection in the jaws than in some other part of the body, owing to the ease of discovering them through the aid of the roentgen ray, or by ocular examination, in pyorrhea infection.

Physicians who have recently been seeking other chronic foci of infections in the body to which certain secondary manifestations may be attributed, find some which are proving to be prolific causes of secondary infections. I would call your attention to an article by Irons.[2] Among these portals are the mucous membrane of the upper respiratory tract and the tissue about the hila of the lungs. In another article, Irons and Brown[3] show that dental infection is not the most common cause of iritis as has been supposed, tonsillary and other bacterial infections being of equal importance.

Pyorrhea Alveolaris

With the exception of the acute exacerbations of pyorrhea alveolaris, that is, the lateral abscesses of Black, there is less danger of this disease disseminating infection through the blood and lymph

1. Euler, H.: Deutsche Monatschr. f. Zahnheil., June, 1923.

2. Irons, E. E.: Some Less Frequently Considered Portals of Infection in Arthritis and Iritis, J. A. M. A. 80:1899 (June 30) 1923.

3. Irons, E. E., and Brown, E. V. L.: Etiology of Iritis, J. A. M. A. 81:1770 (Nov. 24) 1923.

streams directly than there is from closed processes such as chronic periapical alveolar infections. We may have secondary infections from the liberation of bacteria from pyorrhea pockets into the mouth, causing tonsil disease; or the organisms may pass on to the stomach and intestines causing gastric or duodenal ulcers, or may pass out through the intact walls of the intestines, causing metastasis in some organ or part of the body.

Hunter attributed pernicious anemia to bacteria liberated as a result of infection in the oral cavity. Everyone has seen marked improvement in the physical condition of patients following elimination of pyorrhea pockets about the teeth in cases in which there had been no response to other treatment. Complete elimination of deep pyorrhea pockets is not often effected by any treatment other than the removal of the teeth involved or the surgical removal of a portion of the gums, with complete eradication of the pockets. If the infected process has gone so far as materially to loosen the teeth, their removal is indicated. In some instances, pockets may extend nearly or quite to the apex of a tooth on one side of a root, and the tooth, through its attachment on the opposite side, remains firm and does not become loose; but such a tooth should be removed. Roentgenograms are helpful in determining the extent of the destruction of bone and the investing tissues in this disease, but the buccal and lingual destruction is not generally shown. A thin explorer should be used to aid in determining the extent of the injury. As in periapical alveolar infections, the patient's physical condition must be considered in determining how radical the treatment shall be. If the disease is progressing, in spite of treatment, and though the patient's physical condition is good, removal of the teeth should not be delayed, because there is danger that the alveolar process may become so depleted as to render the use of artificial dentures difficult.

Conclusion

Let us not forget, in our enthusiasm to locate foci of infection, that the teeth and jaws are not the only parts of the body in which secondary disease may have its source. We may take specimens from infected root ends, culture them and inoculate animals with the bacteria and induce startling results in the production of disease; but if we collect bacteria from a chronically inflamed mucosa of the nasal fossa or the air sinuses adjoining, we may produce similar diseases. It is needless to enumerate the many other parts of the body specimens from which generally cause disease in remote parts when cultures are made and animals inoculated.

Another thing to be remembered, is the fact that most of the partial restorations made to supply the teeth lost not infrequently cause trauma either of the periodontal membrane or of the gums. Cultures taken from around such teeth will be found to contain that same green forming streptococcus. We may remove a tooth showing a slight apical rarefaction and put in an artificial substitute, which causes injury to the gums or investing tissues; when opportunity is offered for the entrance of pathogenic bacteria into the circulation. In such a case, we have not only lost a tooth which by treatment might have remained useful indefinitely and have done the patient no harm, but we have substituted a condition which may be as serious as that which existed before the tooth was removed. Let us be consistent.

DENTAL EDUCATION AND MEDICINE

THE story of the changes in the conditions attending medical education in this country has frequently been rehearsed in THE JOURNAL,[1] so that readers must have become familiar with the beneficial reforms that have followed the investigation of medical schools and their activities. Proprietary institutions conducted primarily for profit have almost disappeared. Many schools have formed new affiliations destined to promote their stability and educational facilities. Others have met the demands of progress exposed by critical inspection and have raised their standards to a more acceptable plane. The spirit of reform has pervaded even the darkest spots of the weakest medical schools; and the revelations have resulted in wholesome improvements in many directions. Standards and performance have risen to new levels that are highly gratifying.

Changes of a comparable sort seem to be impending in dental education in America, according to the recent report of the president of the Carnegie Foundation for the Advancement of Teaching.[2] When its division of educational inquiry, which has accomplished so much for medical education, inaugurated the study of dental education in Canada and the United States in 1921, there were fifty-one schools in these countries. Fourteen independent dental schools in the United States were frankly proprietary in character or were conducted on a plane that was obviously commercial. Of that group of dental schools two have been absorbed by dental schools in universities; one has become a new integral part of a university; three have effected affiliations with universities that are expected to be initial steps to organic union; the owners of one are endeavoring actively to make the school an integral part of a university; five have been, or are about to be, transferred to boards of trustees of independent organizations that were formed to conduct the schools as nonproprietary educational institutions (although the owners preferred, and the new organizations desire, to make these schools parts of universities); one has been closed; and only one— a Grade C concern—appears to expect to continue as a proprietary school. Accordingly, proprietary dental schools, which were important in 1921 as factors of demoralization in dental education, have become virtually extinct. In addition, mercenary or indifferent management of dental schools by some universities has been definitely discouraged, and in notable instances discontinued. The standards for admission to the schools have been raised; and the outlook indicates that, ere long, dental education will approach a position of scholastic equality with medicine, both in the character of the preliminary study required and in the depth and breadth of the scientific foundation afforded.

Dentistry has become something far greater than mere tooth technology. It occupies an important position in preventive medicine and public health.

1. Medical Education in the United States, J. A. M. A. 81:549, 579 (Aug. 18) 1923.

2. The Carnegie Foundation for the Advancement of Teaching, Eighteenth Annual Report of the President and of the Treasurer, New York, 1923.

President Pritchett has stressed the fact that today the dentist and the physician should stand on a plane of intellectual equality and be able to "talk the same language." The practice of medicine and the practice of dentistry, he writes, are coordinate divisions of health service. They are like trees that have sprouted spontaneously from an old stump, the stump having long since disappeared—trees alike in kind and closely similar in appearance, growing somewhat divergently from the same roots in a common soil, through the same air of freedom and individual opportunity, in the same light toward the sky.—*The Journal of the American Medical Association*, March 29, 1924.

CONTRIBUTIONS OF THE DENTIST TO HEALTH EDUCATION

By GUY S. MILLBERRY, D.D.S., San Francisco, California

(Read before the International Health Education Conference, San Francisco, California, June 28 to July 6, 1923)

THERE is a tendency in all fields of health activity for specialists to lay stress on the importance of their own problems. Dentistry offers no exception to this tendency, and the only thing that may justify its emphasis is that the dental health program is almost universally sold to the public.

But dentistry has been silently, diligently absorbing the general health point of view. In the absence of sanitary measures, quarantine regulations or health ordinances, it has been practicing a form of individual health activity that has received public endorsement by President Wilbur, namely, the prevention of dental disorders by consultation and advice before professional service is required. In addition, dentistry has unhesitatingly trespassed the sacred field of medicine by daring to study biochemistry and discuss diet and nutrition with patients, and it has encroached on the field of public health by incursions into the subjects of personal hygiene and public sanitation.

Pressed, on the one hand, by those who believe that the art of dentistry in repairing and replacing lost teeth or parts thereof is most important, and, on the other, by those who believe that pathology is the basis of all scientific dentistry and that surgery is the only cure, the dentist who believes that the simple and desirable procedure is preventing the conditions which require the service of the groups mentioned above finds little solace in his profession and much support from the public.

Dentistry in its relation to health education embraces (1) the training of the dentists in mouth hygiene; (2) the relation of nutrition to the teeth, and (3) health habits, particularly those related to mouth hygiene.

Training the dentist in mouth hygiene is one subtopic of this discussion. We have modified our courses of instruction

from the ancient practice of *cleaning teeth* to the modern procedure of mouth hygiene, *periodontia* and *prophylaxis,* with perhaps an unfortunate economic result, the specialty of treating pyorrhea.

With sincerity, however, our teachers are impressing constantly on their pupils that a detachment of the periodontal membrane from the surface of a tooth no larger than a pea is a more serious menace to the health of the individual than a number of carious teeth. Such a condition of which the patient is most likely to be wholly unconscious may result in pyorrhea and the ultimate loss of all the teeth, while cavities in teeth are quickly discovered by the patient and usually quickly cared for.

Modern concepts of teaching mouth hygiene demand that everything shall be done in preventive and restorative dentistry that will establish normal function of the teeth, mouth and jaws, so that the natural methods of cleansing the teeth by the excursion of fibrous foods over the surfaces in mastication will be effective, and the artificial methods may be practiced profitably.

Recently, a course in general hygiene has been added to the curriculum in dental schools, and, surprising as it may seem, it is necessary, for many of the matriculants have little knowledge of personal hygiene, especially the care of the hands, those potent carriers of infection in any walk of life.

The next step in teaching mouth hygiene in dentistry was the introduction of instruction for the dental hygienist, a new vocation for women, which is quite widely understood and equally as widely appreciated by the layman.

At the University of California, we urge the adoption of school or institutional hygiene service for children as a vocation for dental hygienists, rather than civil practice service in private offices, where well-to-do adults request and are willing to pay for this service as they would for a manicure or a Hammam bath. We urge it because we believe we are able to prevent many physical disorders and their sequelae, both in childhood and in later life. This procedure is invaluable to the school child, the pre-school child and the pregnant mother.

The relation of nutrition to the teeth is a very simple question in that we know that the teeth receive their structural elements from the blood stream both during the fetal life and after birth, for the teeth begin to develop about the tenth week of pregnancy; and it is a very complex question in that we do not know what chemical processes are going on within the body by means of which the various cells are able to abstract from the blood stream, or lymph, the necessary chemical compounds or elements that are required to construct enamel, dentin, cementum, periodontal membrane and pulp. No less than five different types of cells, each with a special function, are concerned with the development of a single tooth. When we realize that the only known place where we find flourin in the body is in the enamel of the teeth, we appreciate the wonderful selective properties which these small units in our economy possess.

The element calcium, of course, plays an important part in tooth development. Its utilization in the body is not well understood, but through the kindness of Warden Johnston, of San Quentin Prison, we are carrying on a series of carefully controlled calcium metabolism experiments on a volunteer squad, whose residence, habits and activities are fairly well established for a period of time long enough to give us valuable information.

Members of our own profession and of the medical profession have protested that we have no business engaging in the study of diet and nutrition. It should be left to the medical man, whether he be an ophthalmologist, a gynecologist or a surgeon.

We do know, however, that dental students can acquire a knowledge of the subject. We know that the dentist

should teach the importance of the mastication of food. We are charged with the care of this human apparatus, and it is the only part of the digestion under human control. We know that pleasing the palate and satisfying the hunger may not meet the nutritive requirements and we believe that it is not impossible to learn the character, quantity and utilization of food so that we may intelligently advise our patients and, therefore, render a better service to humanity.

We have been told by E. G. McCollum, of the Department of Chemical Hygiene, Johns Hopkins University, that very slight modifications in diet may seriously affect the developing teeth, and we have proved the truth of this statement by animal experimentation. Formerly, we believed that all pitted and deformed teeth, except Hutchinsonian teeth, were caused by skin diseases acquired in early childhood. Now, we are convinced that dietary deficiencies are quite likely to be the cause. Leafy and fibrous foods are stimulating to the mechanical act of mastication and aid in cleansing the teeth. Fruit stimulates the salivary flow. Fresh milk is always good. Starches and sweets are detrimental to the teeth, especially if eaten between meals.

Health habits in mouth hygiene should be inculcated very early in childhood, so early that before the child knows it he has become an addict. Simple methods of brushing the first teeth, as early as the first year, are commendable, the child using a small, soft brush and, if bribery is necessary, a small amount of palatable tooth paste.

Regularity as to the time and thoroughness as to procedure are essential, and, of course, the home is the place of primary instruction in health habits. During this impressionable age, the child will, if properly trained, become so thoroughly habituated to these health habits that the omission of them causes discomfort.

In the absence of home instruction, the next best point of attack is in the schools, beginning with the primary grades. When this is efficiently carried on by a well trained corps of dental hygienists and supervisors, remarkable results have been achieved. Latest reports from Bridgeport, Connecticut, show that every child in the public schools was promoted from the fifth to the sixth grade, while in the past an average of 40 per cent of retardations was not uncommon. In a school in McDowell County, West Virginia, where 250 pupils are enrolled and mouth hygiene has been taught and practiced for ten years, there has not been a single retardation in six years, and many children have jumped grades. This is the economic form of evidence we use in inducing school and other civil officials to adopt a program of health activity that includes mouth hygiene.

In California, the majority of public health officials are anxious to introduce a mouth hygiene program into the schools, because it permits them to carry on other forms of health activity that might otherwise meet with objections.

In conclusion, the older graduate in dentistry, with few exceptions, is not concerned with any public health program. It is a waste of time to endeavor to interest him. The younger graduate has been trained in the particular phases of health activity for which the dentist is fitted. He is asked to participate in this phase of civic life, and occasionally one finds him occupying the position of health officer in his community.

PRENATAL FEEDING WITH SPECIAL REFERENCE TO BONE AND TOOTH DEVELOPMENT

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AT the present time, the medical and dental professions have many interests in common. The recent discoveries of the importance of dental and oral diseases to the health of the body as a whole have stimulated in the medical profession a greater interest in the field and activities of the dentist. On the other hand, the dentists, in the study of the ultimate source and etiology of the various dental malformations and oral diseases, have been led far into the basic sciences of medicine, seeking in them the solution to their problems. No longer may it be said that dentistry is wholly confined to the mechanical repair and replacement of diseased dental organs, for at the present time an ever-increasing effort is being made by dentistry to study the causative factors which underlie dental diseases, to the end that they may be prevented. It is evident that practically all diseases of the mouth are related either directly or indirectly to disturbances of function of other tissues and organs of the body. Consequently, the problems of dentistry are closely linked to the problems of medicine, and many of the former are impossible of solution until further light has been gained by the workers in medical research relative to problems in their field which are of mutual interest to both professions. The subject of this paper is a splendid illustration of that fact.

Medicine, since earliest times, has been interested in the diet of expectant mothers, concerning which there have been numerous controversies and wide divergencies of opinion. There have been those who claimed that, since the mother needed to eat for her child as well as for herself, her diet should be large and increased over the normal. Others believe that a very restricted diet should be adopted in the hope of limiting the size of the fetus and of insuring an easy delivery. Still others claim that the development of the fetus takes place wholly independently of the nutrition of the mother and that it is impossible either to increase or to decrease the degree of perfection of fetal development by modification of the diet. Recently, in the study of diet and nutrition as it relates to infantile rickets, the question has been raised as to whether malnutrition of the mother may not be an active cause in the production of rickets or at least a factor predisposing toward that condition. This again has directed the interest of the physician toward the possible significance of the maternal diet in the development of the child.

The dentist, in his study of the malformations of the jaws and teeth, has been led to inquire into the conditions under which these tissues are formed, and since at least the deciduous teeth and the infant maxillae are largely developed during prenatal life, the investigation of dental dystrophies involves a consideration of prenatal life and maternal nutrition. Thus we find in prenatal feeding

a question of mutual interest to both professions, the solution of which may have an important bearing on many problems in the fields of medicine and of dentistry.

A search of literature reveals the fact that little has been written on the subject of maternal feeding, and until very recently, the contributions which have been made have been confined almost solely to a discussion of the possibility of limiting the size of the fetus. Perhaps the most notable statement of the subject is that of Prochownik,[1] who, in 1889, related his experience gained from three cases of pregnant women having contracted pelvis in which he prescribed a restricted diet for the purpose of "avoiding the necessity of artificial premature labor." He claimed that during the last period of pregnancy the fetus takes on a layer of subcutaneous fat which considerably increases its size. If, during this period, the carbohydrate intake is decreased and proteins are substituted, the fetus, at delivery, will show "a striking thinness and slackness of the skin covering the head, due to the absence of fat tissue, an increase in the mobility of the skull bones against each other which facilitates molding and thus permits an unusual degree of compression of the head during labor." He reported that children of mothers thus fed seemed at birth to be fully matured and showed no evidence of having been harmed by the diet. The head dimensions were average and the cranial bones were of normal hardness, the only difference being a striking absence of fat.

It should be noted that Prochownik did not suggest that this diet be universally prescribed, but recommended that it be used in selected cases in which the pelvis is contracted. Following his announcement, there were many who tried the suggested diets, with varying degrees of success. Bondi[2] reports seven cases, all of which were failures, and Fraenkel[3] says that his experience is contradictory. On the other hand, a large group of practitioners profess to have had success in reducing the size of the fetus by a modification of the diet, and they continue to use it as a regular procedure in all cases coming under their supervision.

Recently, two pediatricians have made independent claims of success in such practice. Eugene Cary[4] feeds large amounts of carbohydrates during the first period of pregnancy to avoid morning sickness and advises the patient to eat frequently. During the second period, he increases the calcium intake and combats constipation. In the last period of pregnancy, he limits the diet for the purpose of decreasing the size of the fetus, which he claims to have accomplished in a large number of cases. Day begins his regulation of the maternal diet in the first period of pregnancy, giving special reference to the calcium intake and the allaying of digestive disorders. During the second period, he also increases the calcium for the sake of the developing teeth prescribing large quantities of milk and administering calcium carbonate in the form of a tablet. During the last period, he feeds a diet tending to keep the weight down, bulky, largely vegetable and green leaf, and low in caloric value. He appends a list of food portions, with the caloric, protein and salt values of each as worked out by Miss Frances Stern of the Boston Dispensary.

Such practice is openly challenged by several writers of distinction, who state

1. Prochownik: Zentrabl. f. Gynäk. 33:577, 1889.

2. Bondi: Wien. klin. Wchnschr., No. 25, p. 1026, 1913.

3. Fraenkel: Handbuch d. Frauenheilk. 3, 1914.

4. Cary, Eugene: Illinois M. J. 43:228 (March) 1923.

that it is not possible to regulate the size of the fetus by a manipulation of the diet and that the feeding of a restricted diet or one containing high percentage of protein is a very dangerous practice. Some of these opinions may be quoted as follows:

Bailey[6] states that the fat of the newborn is very essential, as it furnishes the energy requirements of the infant during the time of his adjustment to lactation. He objects to the Prochownik diet for the reason that its scarcity of carbohydrates does not furnish the fetus with a requisite amount of fat, and its preponderance of proteins may induce toxemia in the mother.

Davis[7] reports one case in which the mother ate meat freely four times daily and the baby was the largest he had ever delivered. He believes that "unquestionably, excess in protein diet produces a larger, overgrown and unduly hard fetal skeleton."

Hugo Ehrenfest,[8] in referring to the Prochownik diet, says "the clinical observations as recorded in medical literature during the past twenty-nine years furnished no valid basis for either the recommendation of such dietary in textbooks or its extensive employment in practice."

Slemons[9] states "that there can be no justification for measures intended to restrict the growth of the fetus, for when rigidly carried out such measures tend to weaken the mother."

All through the literature, there appear positive statements, supported by clinical evidence, that the amount and quality of food ingested by the mother has little if any effect on the fetus. Bondi says that the fetal abstraction of nutritive material from the mother proceeds entirely independently from the nutritive condition of the mother and that the fetus will thrive at her expense even if she is below par. Landsberg[10] states further that "the fetus takes precedence over the mother, and that it will take from her whatever it requires and can be prevented from doing it only by a marked deficiency of that particular substance in the material organism."

From animal experimentation in which the diet of the pregnant females was increased in protein and decreased in carbohydrates, Evvard's[11] conclusions "only show, what is admitted, that diet to a certain extent possibly influences the weight of the offspring but solely by transmitting to the fetus an increased amount of such substances which are supplied to, or are existing in, the maternal organism in abnormal amounts." They do not prove that the fetal development can be retarded by starvation. In this connection, Ehrenfest alludes to the fact that, in the feeding of cattle, it has been impossible to increase the size of the animal by increasing the lime intake. So also the bantam chick will surely develop into a small bantam fowl, and by no form of feeding can its stature be increased. He concludes that "the size of the fetal skeleton is fixed by the germ plasm and is controlled by heredity." He cites the statements of those who attribute the extreme height of the residents of the mountains of Kentucky to the richness of the water and soils in calcium. Concerning them, he says that these Kentuckians are direct descendants of the tall and large-framed Scotchmen from whom they have in-

6. Bailey, Harold: Am. J. Obst. & Gynec. 3:591 (June) 1922.

7. Davis, E. P.: Am. J. Obst. 80:23 (July) 1919.

8. Ehrenfest, Hugo: Am. J. Obst. 80:441 (Oct.) 1919.

9. Slemons, J. M.: Johns Hopkins Hosp. Rep., April, 1904.

10. Landsberg: Ztschr. f. Geburtsh, u. Gynäk. 76:53, 1915.

11. Evvard: Tr. Iowa Acad. Sc. 1913, p. 323; J. A. M. A., Sept. 5, 1914.

herited their characteristic development, and they have not acquired it from any dietary constituent.

Ehrenfest also points out that certain sociologic factors enter into the problem. For instance, mothers who do not perform heavy labor during the term of pregnancy usually carry their children longer and their babies are larger at birth, while those who do heavy labor are delivered much earlier. He believes that overcarrying is the most conspicuous causative factor in excessive size of the newborn. This view is interesting in the light of the findings that rickets is more frequent in the prematurely born. For the pregnant mother, he recommends an increase of 400 calories a day over the normal intake, stating that such food increase is necessary to meet the demands made by the developing child.

Paddock[12] disagrees with the statement that an increased amount of food is needed during pregnancy, believing that the growth of the fetus and the uterus, pelvis and abdominal walls of the mother means no more demand on the maternal nutrition than does the development of neoplasms and the general taking on of weight without apparent cause. He cites the case of dogs, rats and rabbits which give birth to progeny averaging 15 to 20 per cent of their own body weight without requiring any increase in food during pregnancy. He believes that the diet of the pregnant woman should be that which is normal to the nonpregnant unless the expectant mother is doing hard labor, in which case she needs an increase of food and water.

This conclusion is supported by the experimental data obtained by Hoffstrom,[29] who studied the calcium-magnesium balance of one normal patient from the seventeenth week of pregnancy to the time of delivery. He found that, even on an ordinary diet, there was no apparent sacrifice of the organism to meet the needs of the growing fetus. A positive balance of nitrogen, sulphur, phosphorus, calcium and magnesium obtained throughout the experimental period, from which it appeared that the demands not only of fetal growth but also of the coincidental hypertrophy of the uterus and breasts were amply provided for. Furthermore, there was an evident positive balance to the remainder of the maternal body, supposedly in anticipation of the demands of the lactation period.

Davis[7] makes a significant statement when he says, "The most important question in prenatal care is the effect on the fetus of the condition of the mother's nutrition. Does the well-fed mother produce the healthy child and does the ill-fed mother bring into the world the unhealthy and unfit? Here one must remember by the law of evolution that the younger will live at the expense of the older if possible. The embryo or fetus will nourish itself to the very last moment at the expense of the mother. The mother will suffer out of all proportion in disturbed nutrition to the condition of the child, and hence, from the standpoint of the child's interest, the health and strength of the mother should be conserved in every possible way."

All of this naturally leads us to a consideration of the relationship between fetal and maternal nutrition. We know that the various food substances do not pass directly and in equal proportions from the maternal to the fetal blood, but that a certain controlling mechanism exercised by the placenta regulates fetal absorption. The manner of transference is not clear. Two theories are held thereto, namely, the vitalistic and the physical. The vitalistic theory attributes to the walls of the chorionic villi a selective action on the various contents

12. Paddock, C. E: Surg., Gynec. & Obst. 31:71 (July) 1920.

29. Hoffstrom, K. A.: Skandinav. Arch. f. Physiol., 1910, p. 326.

of the maternal serum, allowing each to pass into the fetal circulation in such quantity as is required by the fetus at each stage of development. The physical theory conceives of the interchange of nutritive elements between the maternal and fetal circulations as being purely a physical or physicochemical transference. That is, substances pass through the placental walls as through a semipermeable membrane according to the laws of diffusion from higher to lower concentrations. As pointed out by Feldman,[13] if the physical theory is correct, it might be possible to modify the mother's diet so that, by diminishing the numerical concentration of her blood constituents, the size of the fetus and the softness of the bones could be regulated at will. However, in a comparative analysis of blood from the mother and from the umbilical cord of her child, certain of the food constituents are found to be alike, while others are found in the fetus to be of different concentration from that in the mother. Bogert and Plass[14] found that the calcium content of the fetal serum is consistently higher at the time of birth than in the mother and exceeds the normal calcium range of nonpregnant women. The magnesium content of the fetal and maternal serum is generally the same, although, in a few instances, they found it to be higher in the fetus. Plass and Tompkins[15] found that the lipoid phosphoric acid is increased above normal in the blood serum of women at the time of delivery; whereas, it is present only in small quantities in the fetal blood. The organic phosphoric acid, however, tends to be somewhat higher in the serum of the fetus than in the mother. These findings have been corroborated by a recent contribution of Hess.[28]

The vitalistic theory is further supported by the great mass of clinical evidence that the child is apparently little disturbed by nutritional stress or insufficiency during the prenatal period. During the great famines and wars, when pregnant mothers have been deprived of food even to the point of extreme starvation, they have given birth to children that are apparently normal and surprisingly well nourished. During the Great War, many expectant mothers in Germany suffered from scurvy, osteomalacia and other nutritional disturbances as the result of a lack of minerals and vitamin principles in their food, but the number of infants with similar conditions was small. Day[5] cites a case of a mother who suffered from severe toxemia and vomited continuously for three weeks prior to parturition. The child at birth weighed 10 pounds and 5 ounces and appeared healthy. C. G. Darling relates a case of pregnancy in which vomiting began during the first month and continued throughout the term. Rectal feeding was attempted, but the bowels became so irritated that it was discontinued. The patient became greatly emaciated and starvation ensued to the point of delirium just before delivery. The child when born was apparently normal, and both the child and the mother lived.

An interesting case recently came under my observation. A woman, aged about 25, the wife of a dentist, vomited continuously for thirteen months, during which time she became pregnant and carried a child its full term. Although she was unable to retain solid food and became very much emaciated,

13. Feldman, W. M.: J. State Med. 31:3 (Jan.) 1923.

14. Bogert, L. J., and Plass, E. D.: J. Biol. Chem. 56:297 (June) 1923.

*15. Plass, E. D., and Tompkins, E. H.: J. Biol. Chem. 56:309 (June) 1923.

28. Hess, A. F., and Matzner, M. J.: Am. J. Dis. Child. 26:285 (Sept.) 1923.

5. Day, H. F.: Boston M. & S. J. 188: 904 (June 7) 1923.

the child at birth weighed 7½ pounds and was 24 inches in length. He seemed to be perfectly developed and thrived under the splendid posnatal care that was given under the direction of a pediatrician. At the present time, he is about 4 years of age, and it is of special interest that he has a perfect set of deciduous teeth, well arranged on fully developed arches, without any signs of dental caries. It is also interesting to note that the mother, a primapara, prior to her pregnancy, had no dental caries, but since that time she has developed several cavities. It would seem that the mother had suffered much more, in regard to teeth at least, than did the child.

To these instances may be added many similar cases of malnourished mothers giving birth to seemingly well nourished and fully developed children which have come under the observation of almost every practicing physician. Manifestly, the fetus has the ability to extract substances from the mother's circulation to meet the needs of its own growth, and when these nutritional elements do not exist in the maternal serum in adequate amounts, the mother's nutritive reserve may be drawn on to care for the needs of the child. Murlin considers the fetus to be an independent organism, during the initial stages of fetal life acting as a parasite living on the maternal organism; while in the later stages, the fetal and maternal organisms enter into a "harmonious symbiosis." As soon as the germ cell is fertilized, it acquires a proteosynthetic function, an enzyme action by which it secures from the maternal tissues building material required for fetal growth. Murlin concludes that "present views leave no ground of hope to the obstetrician that he can influence markedly the development of the fetus by changing the mother's diet during pregnancy."

However, in spite of all the opinions to the contrary, there are strong indications that the infant does suffer from maternal malnutrition during the prenatal period.

G. F. D. Smith,[16] in a compilation of case records of 6,162 pregnancies in the hospitals of London and Dublin, reached the following conclusions:

I. A state of bad nutrition of the mother at the time of labor due to insufficient food.

1. Greatly increases the percentage of stillborn.
2. Greatly increases the number of premature births.
3. Slightly decreases the average weight of the full-time baby at birth.
4. Definitely increases the postnatal infantile mortality.

II. A state of good nutrition of the mother at the time of labor.

1. Considerably increases the average weight of the full-time baby at birth.
2. Increases the number of mothers able to nurse their infants, quite apart from any effect of ample diet during that time.

Since the etiology of rickets has been determined to be a form of malnutrition and since it occurs so early in infant life, the question has arisen as to the possibility that rickets may arise from prenatal malnutrition. Schmorl[17] investigated the ribs and long bones of more than 100 infants born either at term or prematurely and failed to find a single evidence of rickets. This finding is borne out by all other histologic examinations of the bones of the newborn. As Park[18] says, "It is probably unsafe

16. Smith, G. F. D.: Lancet 2:54 (July 8) 1916.

17. Schmorl: Ergebn. d. inn. Med. u. Kinderh. 4:403, 1909.

18. Park, E. A.: Physiol. Rev. 3: 108 (Jan.) 1923.

to conclude that rickets can never develop in intra-uterine life but one may be certain that if rickets ever does occur at that time it does so rarely and it never exceeds the slightest degree of development." However, Schick has recently reported the case of a German mother who had a severe form of osteomalacia previous to giving birth to a child. The child was taken from the mother and given to a healthy mother who nursed it and at the same time nursed her own child. Of these two children, both fed alike after birth, the one from the osteomyelitic mother developed rickets and the other did not. Here, then, we see a strong indication that, although children of poorly nourished mothers may not develop rickets prior to birth, they do acquire certain tendencies or a weakness during intra-uterine life that make them more susceptible to that affection. Park[19] states that children prematurely born and twins are highly susceptible to rickets. Hamilton[20] has made the observation that, during the last three months of fetal life, a storage of calcium takes place in the body of the fetus and that during the first few months of life after birth the infant is obliged to draw on this depot. The premature infant, however, has no calcium depot (or has a deficient one) and therefore suffers from a calcium deficiency unless an abundance of calcium is provided in the food. It is this calcium deficiency and perhaps phosphorus deficiency that Hamilton believes to be responsible for rickets in the premature baby.

Hess,[28] in a recent study, finds no relationship between the percentage of inorganic phosphate in the blood of the newborn and the occurrence of rickets during the first year of life.

Byfield and Daniels[21] raise the question, "Is the child born with rickets, or merely with too small a store of building material (calcium depot) for the skeleton, so that rickets develops when conditions become unfavorable or when a dietary error exists?" In answer to their own question, they say, "No matter what the mechanism of action is, we know from our animal experiments that the young of properly nourished animals are less susceptible to this dystrophy, even though they are badly fed. If it be conceded that faulty parental nutrition is one of the chief causes of human rickets, then we have in our hands the most hopeful method of treatment, prophylactic rather than curative."

Thus we see that the opinions of the medical profession regarding the effect of prenatal feeding on the development of the fetus as expressed in the literature pertaining to the subject are vague and uncertain and form no adequate basis for definite conclusions. For the most part practicing physicians are giving little or no attention to the diets of expectant mothers unless, by reasons of digestive disturbances, toxemia with resultant nephritis, or peculiar food idiosyncrasies, they are forced to consider the maternal diet. This has probably arisen from the fact the Nature has established a factor of safety for the child, for, unless there is a complicating hereditary trait or a specific disease, the child, as a rule, will thrive at the expense of the mother, and at the time of birth will be nearly normal in development and general health in spite of any deficiency which his mother might have had. If, then, any attention has been given to the mother's diet, it has been from the standpoint of her welfare rather than that of her child. But, when we view the average diets of American people and see how frequently they are poorly balanced

19. Park, E. A.: Footnote 18, p. 106.

20. Hamilton, B.: Acta. Pædiat. 2:1, 1922.

21. Byfield, A. H., and Daniels, A. L.: J. A. M. A. 81:360 (Aug. 4) 1923.

or markedly deficient in caloric values, in calcium and phosphorus, and in the accessory food factors, and when we consider the harm that may ensue to either the child or the mother, or both, it would seem that this is a fertile field for research, to determine definite principles of prenatal feeding which may be adopted by the profession at large.

Sherman and his collaborators, in a report made to the New York Association for Improving the Condition of the Poor, made a study of the calcium and phosphorus content of the dietaries of 224 family groups, distributed throughout the United States. Of these family groups, eight showed less than the normal phosphorus content in the diet, and two of these were from southern states. In connection with calcium, one out of every six showed a calcium content below normal requirements. Hence, it was concluded that, in the average American dietary, there is little danger of a deficiency of phosphorus, but that many American dietaries are close to the border line in regard to the calcium content.

Concerning the effect of malnutrition during prenatal life on the teeth of the child, there is still less accurate information. It is an old saying, "For every child that is born a tooth is lost," meaning that during the period of pregnancy the teeth of the mother are likely to be diseased. Just how the mother's teeth are affected by the vicissitudes of pregnancy is not clear. Possibly, the fetus, in its need for calcium, may, when that substance is low in the maternal serum, draw on the stored calcium in the bones and teeth of the mother, thereby lowering the resistance of her teeth against disease. It is more probable that the greater factor is to be found in the change of the salivary secretions resulting from general metabolic disarrangement common to pregnancy and the establishment in the mouth of an environment more favorable to the activity of caries forming bacteria. This, in conjunction with a possible decrease in the resisting powers of the tooth, may explain the susceptibility of the teeth of pregnant women to dental caries. There are indications, however, that the teeth of the mother may in a measure be protected from disease by the adoption of a well-balanced diet during pregnancy. Widdows[22] confirms the observations of DeWesslow that the calcium and phosphorus of the maternal blood serum uniformly decrease during the last two months of pregnancy. On account of the increased demand for calcium during the latter stages of pregnancy, Widdows advises the inclusion of milk in the mother's diet at that time in amounts greater than would be included in the average adult diet. Such a fortification of the diet might prevent the depletion of the maternal bones and teeth to meet the calcium requirements of the fetus.

As to the teeth of the child, we know that calcification begins about the seventeenth week of fetal life, and the greater portion of the crowns of the deciduous teeth are formed prior to birth. An equivalent number of permanent teeth also are in various stages of the formative process, but none of them, at birth, have completed any appreciable amount of calcification. Any dystrophies of the teeth, therefore, resulting from prenatal disturbances or malnutrition would be registered in the structure and form of the deciduous teeth and the infant maxillae. Clinically, we see many instances of dental hypoplasia and malformations, some of which seem to be related to imbecility or internal secretory disturbances, others to specific disease, especially syphilis, and still others to malnutrition. Malformations and imperfections of form and structure of the teeth occur so frequently that they are the rule rather than the exception in the present generation of American people, and seldom indeed do we find individuals with a normal or ideal type of tooth develop-

22. Widdows, S. T.: Biochem. J. 1923, p. 34.

ment. Because of the great prevalence of these dental dystrophies, an attempt has been made to correlate them with the same common metabolic fault, and by many they have been attributed to faulty nutrition during the prenatal period. It is then in the search for the cause of dental and maxillary maldevelopment that we become vitally interested in the question of nutrition in both prenatal and postnatal periods of the child's life.

As to the question of the time of life at which these nutritional or metabolic disturbances take place, it is a most significant observation that dental and maxillary dystrophies are almost invariably confined to the permanent teeth and alveolar structures. Even when the evidences of hypoplasia and malarrangement of tissues are marked, the deciduous teeth are usually apparently normal and well arranged on normally developed infantile arches. From this, it would appear that any disturbance of nutrition or metabolism must have occurred after the formation of the deciduous teeth and before or during the development of the permanent set. Chronologically, the tooth and maxillary disturbances fall definitely into the postnatal period, and seldom do we find them registered on dental structures formed prior to that time. Instances of hypoplasia of the deciduous teeth occasionally appear, but when they do they are usually associated with mental instability, hereditary syphilis or some other pronounced congenital disturbance.

It would appear, then, that, so far as the teeth are concerned, prenatal development as a rule proceeds in a fairly orderly and satisfactory manner in spite of any ordinary nutritional disturbances which may exist in the mother during that time. For the correction of any nutritional faults which might be directly or indirectly responsible for dental hypoplasia, it is especially important that, during the postnatal period, the diet of the mother in lactation and of the child after that time should be most carefully regulated. We cannot say that the child's teeth cannot be affected by nutritional faults of his mother during his prenatal life. It is quite within the limits of possibility that, although prominent defects resulting from nutritional disturbances are not apparent in the deciduous teeth, stigmata may be produced on the permanent dental follicles which will influence the later tooth development, or the fetal metabolism may be so altered that, during postnatal infantile life, its ability to form normal bones and teeth will be seriously affected, as expressed in evidences of rickets and hypoplastic teeth. Erdheim,[23] in his researches on the effect of parathyroid removal, concluded that tooth hypoplasia is a phenomenon of a disease which concerns the whole skeleton, namely, rickets or osteomalacia. Mae Mellanby[24] found in the puppies to which her husband had fed fat-soluble A deficient diets for the production of rickets, that there were also marked abnormalities of the teeth and alveolar bones. The teeth were soft and friable and on analysis, were found to be deficient in calcium salts. The alveolar processes were absorbed or underdeveloped and the deficient portions were replaced by osteoid tissue. Quite similar results were obtained by Percy Howe[25] in guinea-pigs fed on a scorbutic diet and by McCollum and Grieves[26] in rats fed on diets deficient in fat-soluble A, calcium and phosphorus. Thus, it appears that the development of the teeth may be seriously disturbed by any nutri-

23. Erdheim: Frankfurt. Ztschr. f. Path., 1911, p. 238.

24. Mellanby, Mae: Dental Rec. 40:63, 1920; Australian Dental Soc. J. 1:467, 1921.

25. Howe, P. R.: J. Dental Res. 3:7 (March) 1921; J. A. D. A. 8:633 (Aug.) 1921; 9:55 (Jan.) 1922; 10: 201 (March) 1923.

26. Grieves et al.: Bull. Johns Hopkins Hosp. 33:202 (June) 1922.

tional fault which will produce abnormalities of bone development in either the prenatal or the postnatal period.

Moreover, it is of special significance that, although in later years the bones of the rachitic child may become fully calcified and apparently normal, the lesions of the teeth cannot be similarly repaired. Abnormalities in the development of the teeth remain as defects throughout the life of these dental organs. Thus, if, as it seems probable, many tooth hypoplasias are the result of rachitic disturbance of infantile growth, these defective teeth may be the only permanent record of the disease which remains throughout the life of the individual.

From all the foregoing it is reasonable to conclude that the diet of the mother during pregnancy is an important matter. Although the child, in case of dietary deficiency, may draw on the maternal tissues for its support, it is unquestionably true that infantile development would be of much better order if all the requisite food materials were furnished in abundance in the maternal serum. Chick[27] has pointed out that, although the undernourished mother may sacrifice herself during the prenatal and nursing periods for the sake of the child, unless she has the requisite amount of accessory food elements, no amount of proteins or inorganic salts which she may furnish will be adequate to produce growth. Chick finds that mothers usually have an abundance of vitamins B and C but are frequently deficient in fat-soluble A vitamin. A mother who is on an inadequate and deficient diet is therefore not only seriously depleted in her own bodily strength and food reserves, which should be available during the early periods of lactation, but she is also unable to give to the fetus all that it requires for building a normal healthy body. There is no gainsaying the fact that the mother should be supplied with the food materials necessary for the growth of the fetus and for her own sustenance during the prenatal and lactation periods. To whom, then, should she go for guidance if not to her physician? Surely, this important task should not be delegated to the charlatan or the empiricist; it should be a challenge to the medical profession to stimulate in them the desire to know more of this particular branch of medical service for the good of their patients. So far as the teeth of the mother and child are concerned, we believe that, when the medical profession properly considers and corrects the faults of nutrition in the prenatal and lactation periods, a large part of dental hypoplasias and the maldevelopment of the teeth and maxillary processes will simultaneously be eliminated.

27. Chick, H., et al.: Lancet 2:7 (July 1) 1922.

Conclusions

1. There is little accurate information relative to the proper dietary regimen of the expectant mother.

2. The diet during pregnancy should be adequate to the needs of the mother and the growing fetus. It should contain at least the minimum of carbohydrate, protein, fat, mineral salt, and vitamin requirements of the normal individual.

3. There are indications that development of the bones and the teeth may be disturbed by gross nutritive faults during the prenatal period, but it is more probable that the greatest effects of nutritive disturbances are noted after birth.

4. It is highly important that physicians instruct their maternity patients relative to their diet during pregnancy.

5. There is great need for further research on this problem.

The Journal of the American Dental Association

5 North Wabash Avenue, Chicago, Illinois.

Please send in promptly notice of change of address, giving both old and new. Important information regarding subscription price, etc., will be found in the advertising pages.

Editorial

DIFFERENCES HARMONIZED BETWEEN THE AMERICAN DENTAL ASSOCIATION AND THE STATES OF NEW YORK AND IOWA

Considerable agitation has occurred in the profession over the differences which have arisen since the Cleveland Meeting at which a raise of dues was voted by the House of Delegates. The states of Iowa and New York protested the action on the grounds of unconstitutionality, and as a consequence much comment and inharmony prevailed. It has been a source of great concern to all, and it is therefore a pleasure to announce that the matter has been amicably adjusted pending the meeting of the House of Delegates at Dallas. In the Editorial Department of this issue will be found the account of a recent meeting of the Ad Interim Committee of the Trustees, together with the President, President-Elect and Secretary of the American Dental Association, and a representative from each of the states of New York and Iowa.

The results of this conference may well be viewed with much satisfaction by everyone interested in the Association. It is a demonstration of the fact that when differences of opinion arise among men, the most effective and logical way of harmonizing these differences is to have the parties interested in the questions under dispute meet in a frank and cordial discussion of the issues at stake, rather than to carry on negotiations by correspondence or to resort to court procedure, as was done in this instance. The President did a very wise thing in calling this conference, and now that it has resulted in an agreement which seems fair and equitable to all, the suggestion is here made that the entire membership drop all acrimonious comment, and unite as one man under President Giffen to make the Dallas meeting an unbounded success.

The thing of paramount importance is that the whole organization shall function for the best interests of the profession, and that every member shall consider it his particular duty to contribute something in the way of harmony and helpfulness to the Association. If all our members will approach their obligation in this spirit, the prevalent discord of the past will soon be forgotten, and our grand old Association will advance at a pace never before approached.

The officers of the American Dental Association and the states of Iowa and New York are to be congratulated on their good sense in coming to an agreement on a question which seemed on its face to present insurmountable difficulties, and it is only another demonstration of the patent fact that, in any emergency of life, the surest way to arrive at an equitable adjustment is to get sensible and able men together in mutual conference, where they may frankly and freely present their claims, and have them met in an equally frank manner. After all, men usually disagree more through lack of understanding than from variances of opinion, and the surest way to bring about harmony is, therefore, to enable men to understand each other.

At the annual meetings of the state societies of New York and Iowa immediately following the meeting of the Ad Interim Committee at Detroit, action was taken by these bodies agreeing to the plan outlined, and THE JOURNAL was accordingly released to the members of these two state societies. This solves for the present what had grown to be an acute situation, and leaves the sane and thinking men of the Association free to deliberate calmly and judiciously on what it will be the wisest thing to do at Dallas. With the best brains of our organization working unselfishly and harmoniously on this and other problems, we may confidently look forward to an era of increased activity and usefulness for our splendid Association.

PROCEEDINGS OF A MEETING OF THE AD INTERIM COMMITTEE OF THE AMERICAN DENTAL ASSOCIATION

(Held in Detroit, May 3, 1924)

At a meeting of the Ad Interim Committee of the Board of Trustees of the American Dental Association, together with the President, Secretary and a representative from each of the two states of New York and Iowa in the persons of Drs. H. J. Burkhart and Roscoe Volland, held at Detroit, May 3, 1924, Dr. C. N.

Johnson was asked by the President to present a plan for harmonizing the differences which have arisen between the officers of the American Dental Association and the states of Iowa and New York over the action of the House of Delegates at Cleveland, September 10-14, 1923, in raising the dues of the Association. The statement follows:

Statement Presented to the President, Secretary and Ad Interim Committee of the Board of Trustees of the American Dental Association, at a Meeting Held in Detroit, Michigan, May 3, 1924

By C. N. Johnson

Mr. President and Gentlemen:

In a laudable and altruistic effort to best serve the Association, your President has called this meeting for the purpose of considering ways and means whereby the differences which have arisen as the result of the action of the House of Delegates at the Cleveland meeting, September 10-14, 1923, in raising the dues, might be amicably and equitably adjusted. He has done me the honor to request me to make a statement to your committee, embodying what I believe to be a just and reasonable solution of the situation, and I think I should preface my remarks with the assertion that any suggestions I may make are wholly my own suggestions—that I have not consulted anyone as to what I should say or not say, nor have I intimated to anyone what my solution is. I take the liberty of making this clear so that any limitations in my logic may at the outset be known as my own limitations, and not chargeable to anybody else. First, I would thank the President for the compliment conveyed in the invitation he has extended to me, and I would also assure him that I have approached this problem with the most serious and deliberate consideration that I was able to give it. If, therefore, I express the conviction that the solution of this difficulty is much simpler than most men seem to think, I am sure it is only because I have brought my reasoning down to the bare fundamentals of the question, and ignored the many side issues which have intruded themselves into the situation.

In the increasing complexities of our modern life, it is only natural that differences of opinion will arise among men in conducting the affairs of the various group organizations with which we have surrounded ourselves in our daily lives. The larger the organization, and the more complex its machinery, the greater the liability to these differences, and thus it is not altogether to be wondered at that, in our own beloved American Dental Association, there have developed some lines of cleavage. This cleavage has become so serious that if not checked immediately, and reconciled in some manner, it threatens to undermine the fabric of our organization, and to start a disintegration that in its ultimate results, may well be viewed with alarm. This is no fanciful picture—it is a profound and pertinent fact.

While you are all informed with regard to the difficulties that have arisen, it may be well to restate them briefly. At the meeting in Cleveland, the House of Delegates passed an amendment raising the dues of the American Dental Association to $4.00. The present contention relates to whether or not this amendment was passed in a perfectly legal and proper manner. The officers of the Association believe that it was, while two great states—New York and Iowa—believe that it was not. Personally, I think I ought to say that in the present situation I am not taking sides. Frankly, I do not know which side is right. But no matter which side may be right or which side wrong, one thing at least is certain: both sides firmly and conscientiously believe that they are right. Of this I am fully convinced; otherwise, I should never have permitted myself to be brought into this controversy.

What then is the situation today? These two great states of Iowa and New York have decided not to pay their dues on the basis of the Cleveland amendment. The officers have decided that the men of New York and Iowa cannot be considered members of the American Dental Association on the basis of the former dues, and have accordingly stopped mailing The Journal of the American Dental Association to their members. This has naturally caused a somewhat serious rupture between the officers and the two states.

As I view it, there are two ways of settling this controversy—to take the matter to court, or to settle it among ourselves in a conference such as the President has called today. Needless to say, I am unalterably opposed to court procedure, and in favor of this kind of conference. As I have already written the President, if we have not brains enough in our splendid

organization to settle our own affairs, I have greatly overestimated my colleagues of the American Dental Association.

Let us consider for a moment what will happen if this matter is taken to court. In the first place, permit me to state with all the emphasis I possess that no man is wise enough to predict how such a case will be decided in court. At the March meeting of the Board of Trustees, we listened to statements from two eminent members of the legal profession, and they were so diametrically opposed one to the other that there was no possibility of reconciling the two. The courts are administered by men of the same kind of legal caliber; in other words, we may say, with the utmost respect for the law and its wisest administration, that the courts are administered by men who are human, and who are encompassed about by human limitations. No case to my mind is ever settled by court procedure. That may seem an unwarranted statement, and one calculated to reflect on the law. It is not so intended, but rather to emphasize the fact that a court decision in itself never finally settles any question—it is never fully and definitely settled until it is settled in the minds and hearts of those most vitally concerned.

Suppose that this case is taken to court; there can be only one of two results; and either, as I see it, will end in disaster to our Association. If, on the one hand, New York and Iowa should win the suit, it would at once throw our organization into confusion, and start the possibility of a disintegration in our ranks. Thereafter, no action of the House of Delegates, whether good or bad, would ever be secure from attack. Every disgruntled individual, or group of individuals, whether with justification or without it, would immediately, on the passage of some measure that did not please them, throw the question into court, and keep the Association in a constant state of disorder and uncertainty. Of this I am fully convinced.

If on the other hand, the case should be decided against Iowa and New York, what would happen? Something to my mind equally unfortunate. In the present mental disturbance of the men of these two states, they would immediately walk out of the American Dental Association, and nothing that you or I would do could prevent them. In that respect, they are perfectly free agents. Of course, if they remain in the Association, they can be compelled to abide by the rules of the Association; but they cannot by any known process be compelled to remain in. What a spectacle it would be to the whole world of dentistry for us to have a so-called American Dental Association with two of the leading states on the outside! It must not be permitted. To me, the bare idea of such a thing is wholly unthinkable. The American Dental Association has need of the support of these two banner states—it has need of their wise council, and their moral, scientific and financial support. And conversely, these two states have, in even greater measure, undoubted need of the sustaining influence of the American Dental Association. However great a part may be, it is never greater than the whole, and so from every angle of the interests of both sides, and for the betterment of dentistry in this fair land of ours, these states must be kept in our national organization.

This body, sitting here today must settle this matter on an equitable and amicable basis, and as I have just intimated, I believe we have the brains to do it. In approaching the solution of any question of this kind in which the two parties to the settlement seem so irretrievably at odds, it becomes necessary for the broadest exercise of charity to enter into the deliberations. No stiff-necked contention on the part of either side will ever get us anywhere in our negotiations. No stern demand for the literal pound of flesh will avail us in the solution of our problem. It should be remembered that no man is always entirely right or wholly wrong. We are all hedged about by the limitations of humankind, and he who arrogates to himself the status of infallibility is treading on precarious and untenable ground. What we need at this time, as at all other times, is the breadth of vision to enable us to recognize the other man's point of view, even if in so doing we are compelled to change our own slightly.

And in settling the great issues of the world, our profoundest thinkers have frequently found it necessary to do this. To yield a trifling point here and a point there is not an expression of weakness. It is not a perversion of principle, nor a concession of conscience. It is merely a broadening of our mental horizon so that we are able to perceive the rights of others, and to govern ourselves accordingly. It is merely meeting others a legitimate halfway in the adjustment of our differences; it is merely extending the right hand of good fellowship in a magnanimous sacrifice of self-interest for the common good. We are not stultifying ourselves in any way when we acknowledge in our heart of hearts that in some respects we may be wrong and others may be right.

In settling this problem of ours, there are just two bodies to whom we, as conservators of the welfare of our organization, are accountable. We are accountable to the Government of

the United States in the form of the Post Office Department, and we are accountable to our own legislative body, the House of Delegates. If we fully satisfy these two in arriving at a solution of our problem, we are assuredly on safe ground.

Let us see in what respect we are affected by our postal rules, because we must at the outset recognize the fact that there shall be no possible equivocation in the most punctilious compliance with all governmental regulations. There must be the strictest observance, not only of the letter but of the spirit of the law—not only of the spirit but of the letter.

As has been stated, when the action taken at Cleveland was questioned by New York and Iowa, and they declined to pay dues on the basis of the new regulations, THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, which is regularly sent to its members who are in good standing, was no longer sent to these two states. This action was taken on the ground that it would be a violation of the postal regulations to continue to send THE JOURNAL. It is not difficult to realize that this seemed a hardship to the men of these two states. In New York particularly, I think we must recognize that there was some justification for an aggrieved feeling. I do not know how it is in Iowa, but at least in New York, the members are accustomed to pay their dues a year in advance, and thus it happened that before the Cleveland meeting the Secretary of the American Dental Association had, in the proper performance of his duties, sent membership cards to the New York men for 1924. Under the circumstances, I believe that we may well forgive these men for thinking that they were members, and entitled to their JOURNAL. I think that probably you and I would feel the same way. And in this connection I may say that the action at Cleveland, however legitimate it may have been, and without the slightest ulterior motive on the part of those responsible for it, had an element of retroaction in it. To this I think we must all agree.

If, therefore, some arrangement can be made whereby the members of these two states may legally receive their JOURNALS on the basis of the old dues till such time as the House of Delegates meets at Dallas, I think it should be done. We should never lose sight of this one thing; that our House of Delegates is the supreme legislative body of our Association; that it is within its power to make any legislation for our organization that it wishes so long as it does not conflict with the laws of the land, and that there is no regulation whereby it could be prevented from changing its rules from time to time. In fact, it is the final arbiter of our difficulties—the real court of last resort. To it, an appeal may always be made with the full assurance that it is the ultimate judicial body of our organization. It is, therefore, evident that this matter must eventually go to the House of Delegates, and our present function is merely to act in an ad interim capacity and provide means whereby the Association may function acceptably for everybody interested till such time as the House convenes at Dallas.

The first question to settle is as to whether or not we may find a plan by which THE JOURNAL may be sent to our colleagues in New York and Iowa on the basis of the dues formerly in operation. While it was honestly the opinion of our officers that this could not be done, there has been a ruling of the Post Office Department which may assist us in our dilemma. In a letter to a member of our Association on this subject, the Third Assistant Postmaster-General wrote as follows:

My dear Sir:

> In reply to your letter of the 20th ultimo, you are advised that this office has made no such ruling as quoted in your letter from the *Journal of the American Dental Association*, nor has there been any modification of the postal regulation providing that a publisher may continue to mail his second-class publication at publishers' second-class pound rates of postage to a subscriber for the period of one year from the date of expiration of the subscriber's subscription in order that the publisher may have an opportunity to obtain a renewal thereof.
>
> However, it is optional with a publisher either to discontinue mailing the publication at the date of expiration or to continue it thereafter for the period above stated for the purpose indicated.
>
> Questions involving the legality of an increase in membership dues which include subscription to a publication or of penalty for failure to pay such or other membership dues or to pay the same before a stipulated date, are, as stated in my letter to you of the 27th ultimo, questions for settlement between the respective parties themselves, through the courts or otherwise, such quesions not being for the determination of the Post Office Department.
>
> Sincerely yours,
>
> (Signed) A. SWING GLOVES,
> *Third Assistant Postmaster-General.*

This would seem to be ample authority whereby THE JOURNAL might be sent with the full sanction of the post office officials. But let us go even farther. Supposing that for some reason this ruling should prove erroneous as it applies to our case. The thing to do then would be to go directly to the postal officials; place the matter frankly and fully before them, and ask their assistance in adjusting it on an equitable basis. If appealed to in this spirit, I doubt not that they would cordially suggest some plan whereby our entire membership could receive THE JOURNAL, because of the merits of the case, and the fact that it would be a reasonable and just thing to do. Our splendid Government was founded on the principle of service to the people, and it is not on record that it has yet lost this function.

This having been thus equitably disposed of, there is only one other consideration connected with the mailing of THE JOURNAL. There is a provision in our Constitutional By-Laws which says: "Sixty (60) days after January 1, the General Secretary shall drop from membership roll the names of all whose dues for the current year shall not have been received."

A strict interpretation of this provision might be construed as prohibiting the sending of THE JOURNAL to New York and Iowa men, but there are several considerations which might well prevent the literal application of this rule in the present situation. In the first place, as I understand it, the dues of these men have been tendered the Association on the basis of the former rates, and this could very logically be construed as entitling them to receive THE JOURNAL under the circumstances. Even if this could not be done, I want to raise the question as to how much impropriety there would be in the Trustees taking it on themselves to extend the time in this one instance, for good and sufficient reasons, to the first of May, June or November, instead of the first of March? I have just said that after the postal regulations are squarely met, the only body having jurisdiction over us in this particular matter is the House of Delegates. Supposing we, in this emergency, in the interests of harmony and equity, took it on ourselves to make this extension; and then frankly went to the House of Delegates and placed the matter before them, how many of them would find it in their hearts to censure us? The Trustees have already, in a praiseworthy attempt to harmonize the situation and conserve the interests of all, exceeded their literal prerogative in voting to set aside all funds collected this year in excess of the dues paid on the basis of last year, until such time as the House finally passes on the question at Dallas. If this was an appropriate action—and I am inclined to contend that it was—is it not equally appropriate that we make a minor digression from the literal application of the By-Laws, to meet successfully what has become an acute situation? So confident am I of the cordial endorsement of the House that I am willing to go before that body personally and accept full responsibility for taking the initiative in making this suggestion, and I have such perfect confidence in the generosity and good sense of the personnel of our House of Delegates that I do not anticipate any censure at their hands for having done a thing that seemed so essential to a harmonious outcome.

And now there is one thing more. Supposing we are able to come to an agreement, and are successful in providing a plan whereby THE JOURNAL may be sent to all of our members until the meeting at Dallas, it is quite natural for our officers to desire some pledge from New York and Iowa that, in the event of a raise of dues being ratified by the House, these states will cordially come forward and provide for this raise as have the other states who have already paid their dues. It must be remembered that more than forty states have paid the increase of dues, and these states must be reckoned with in the same equitable spirit that we are trying to reckon with Iowa and New York. In other words, we must aim not to discriminate between any of the states.

It would seem that from all quarters there is a widespread sentiment in the Association in favor of a raise of dues. The men of Iowa and New York have repeatedly affirmed that it is not with them a question of money; that they are perfectly agreeable to a raise of dues provided the action is taken in such deliberation, and after such consideration, that there can be no question of its legality and wisdom. Taking them at their word, the officers may well ask that provision be made whereby the Association will be assured of their acquiescence, in case the Dallas action is favorable to a raise of dues.

But, on the other hand, how can their representatives here today be asked to pledge any such thing in the absence of their officers, or to go farther, without action of these state societies at their next meeting? To do this would be to exceed their just prerogative, and to

subject them to the possibility of severe censure. This would, therefore, seem to present an insurmountable barrier to an agreement, and yet I am frank to state that of all the problems presented for solution in the present situation, this one just mentioned has been to me the simplest of all. It has been so very simple that the instant it was presented I had the solution clearly fixed in my mind. It is this: So completely convinced am I of the sterling integrity and the perfect good faith of the men of New York and Iowa, that the moment this committee comes to an agreement on the basis of the suggestions herein made I will at once deposit with the Treasurer of the American Dental Association my personal certified check for the amount representing the difference between the dues of these two states on the basis of the former rates, and the rates suggested at the Cleveland meeting. New York has approximately a membership of 3,000 and Iowa of 1,000. If these two states have been paying one dollar per member toward the Research Fund, as I have been informed, it will mean an addition of one dollar per member to meet the new rates. I will, therefore, deposit the sum of $4,000.00 with the Treasurer of the American Dental Association to be held by him in trust till the House has finally passed on the question at Dallas. I chance to be assured that Iowa has paid this one dollar, but if it should so happen that New York has not done so I will deposit $6,000.00 for New York instead of $3,000.00—making $7,000.00 in all. I would stipulate that the Treasurer be instructed to place this money on interest during his possession of it, and that the sum so realized as interest revert to the Association as will the interest realized on the new dues paid by the other states, to the end that there shall be absolute equality among all of the states.

I trust that you will permit me to say that I crave the privilege of making this deposit because of the supreme satisfaction it gives me to do so, and because it absolves the officers of any charge that they have failed to safeguard the welfare of the Association. And I do it all the more cheerfully because I believe it to be the simplest and most sensible way of solving a situation which might otherwise be considered complicated.

To sum up, my proposal is this: That provision at once be made for the mailing of THE JOURNAL on the basis of the former dues till such time as the question of a raise is finally adjudicated by the House of Delegates at Dallas, to urge the members of the New York and Iowa Societies to consider this question calmly and judiciously at their coming meetings, and, if consistent with their convictions, to take such action as will show a generous disposition to cast their lot with all the other state societies in any decision which the House of Delegates, after due deliberation may make. Also that the officers of the American Dental Association be protected by the deposit of a sum with the Treasurer which shall equal the added amount which the two states would have paid under the new arrangement.

Your President has done me the honor to intrust me with the mission of bringing to you a proposed plan of adjusting our differences. This I have done with an eye single to what I have deemed the best interests of the Association, and I submit it to your careful consideration, with the hope that you may in your wisdom consider it logical and worthy of your endorsement. Whether or not you may find yourselves in agreement with what I have presented, I can assure you that I still stand ready to assist you in any way tending to the betterment of our organization.

One request in conclusion: I make a most earnest plea that in the event of an agreement on the basis of the plan here proposed, or any other plan, every individual who has in any way been involved in this controversy shall at once cast aside his animosities and his contentions, that there shall be no recriminations or undercurrents of antagonism one against the other, but that all shall unite in a spontaneous and whole-hearted effort to work harmoniously for the present administration, and for the welfare of this grand old Association which you and I have learned to love so well.

It was resolved by the Ad Interim Committee that it was the sense of the meeting that the Trustees representing New York and Iowa be hereby instructed to submit to their respective state organizations at the coming meetings the proposed plan, with the understanding that the two states be regarded as members of the American

Dental Association on the basis herein suggested, and that they, by resolution, guarantee the difference between the dues under the old plan and the Cleveland Amendment, in case the House of Delegates at Dallas approves the raise of dues.

The President and Ad Interim Committee of the Association promise a full and free discussion of the whole matter before the House of Delegates at the coming meeting at Dallas.

WILLIAM A. GIFFEN, *President*
OTTO U. KING, *General Secretary*

THE DENTAL SOCIETY OF THE STATE OF NEW YORK

Dr. Otto U. King, Feb. 7, 1924.
5 North Wabash Avenue,
Chicago, Illinois.

My Dear Dr. King:

Your note with the copy of Mr. Hudson's reply to Dr. Ottolengui's letter at hand for which I want to thank you very much. There seems to be a decided mix-up here, and I want to take this opportunity in commending you in your absolute fairness and frankness and sincere desire to be perfectly fair and frank with the New York State Society as I am sure you are with the American Dental Association.

Very truly yours,
CHAS. M. DUNNE, *President.*

IOWA STATE DENTAL SOCIETY

Dr. Otto U. King, Feb. 11, 1924.
Chicago, Illinois.

My Good Friend King: I want to thank you for the courtesy in sending me the opinions of the attorney regarding Cleveland meeting controversy. I fully understand your position and the effort you have made to be most fair and impartial. . . .

With kindest personal regards, I am

Very sincerely yours,
J. G. HILDEBRAND, *Member Executive Committee.*

THE DALLAS MEETING

Sixty-Sixth Annual Session

American Dental Association

To be Held in

DALLAS, TEXAS

November 10, 11, 12, 13, 14, 1924

INSTRUCTIONS RELATIVE TO SHIPMENTS OF JAPANESE CONTRIBUTIONS

FROM THE WEST COAST

Dr. Otto U. King,
5 North Wabash Avenue,
Chicago, Ill.

Dear Doctor King:

With reference to the Japanese Relief Fund, all goods are to be shipped to James W. Edwards Dental Supply Co., 323 Geary Street, San Francisco, Calif., marked "Japanese Relief", to be stored there awaiting shipment.

We have consulted the Japanese Steamship Co., asking them to take charge of the transportation of goods to be sent to Japan, but have not made any definite arrangement.

A suggestion was made by some of the men in the profession that a notice be placed in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION in this connection. Care should be taken to forward only instruments or appliances in usable condition. Hopelessly broken instruments or appliances are useless to the recipient and not creditable to the donor.

I will keep you informed on the progress of this committee.

Very truly,

JAMES ALLAN GRAHAM,
Howard Building, San Francisco, Calif.

Plan for handling Japanese Relief as approved by the Executive Council of the California State Dental Society.

1. RECEIPTS
   - (a) Dental equipment:
     Large, heavy equipment, such as chairs and cabinets are undesirable, especially from the Middle West, on account of freight rates.
     Small equipment, forceps, hand instruments and supplies should be sent express or parcel post.
   - (b) Dental books and journals:
     State needs through THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and collect same at nearest point from Western depot.
     Determine first by letter, whether or not material is needed.
     All textbooks are desirable.
   - (c) Money:
     Appropriations from state associations, supplemented by private gifts.
2. HANDLING MATERIAL
   - (a) Receiving organizations.
     How they should be appointed.
     Point of storage: James W. Edwards Dental Supply Company, 323 Geary Street, San Francisco, Calif., marked "Japanese Relief."
   - (b) Repacking and shipping:
     Employment of packers, cartage.
     Shipping.
     Export, duty and permits.
     Transportation.
   - (c) Records and reports:
     Depository for funds, local expenditures.
     Classifying and indexing material.

Freight and express shipment tags.
Correspondence and final reports.
Time limit for sending material.

The California State Dental Society is willing to give approximately $500, to be sent direct or used here for cartage, repacking, postage, etc. The colleges in this city have technic material that can be used for Japanese schools, and other colleges would be willing to help in this way if advised. The technic work would aid the schools in commencing sooner.

Twelve sets of JOURNALS will be needed for various schools and should be secured within a radius of fifty miles of San Francisco or New York to reduce transportation charges.

Dr. Otto U. King,
5 North Wabash Avenue,
Chicago, Ill.

Dear Doctor King:

I am inclosing herewith a copy of a plan for handling the Japanese Relief fund, approved by the Executive Council of the California State Dental Society, at a meeting held at the Medical Building, April 19, 1924, at 2:30 p. m.

I personally will not be responsible for any express, freight, cartage, etc., charges incurred in handling this fund.

Very truly,

JAMES ALLAN GRAHAM.

FROM THE EAST COAST

EXTRACT OF LETTER FROM DR. WHEELER TO DR. KING

I took the matter (of shipping supplies) up with the president of the Standard Oil Company and received from him the following:

"I have yours of March 7, and in reply would say that our company will be glad to ship without expense to you, for your dental associates such material as you may wish shipped to Tokyo, Japan. Our boats leave from New York and San Francisco (many more of them, however, from San Francisco than from New York), and we can give you the dates of sailing after you advise us when the goods are ready to ship. . . . Because of our shipping not being directly under my supervision, won't you be good enough to address any further communications to Mr. F. S. Fales, 26 Broadway, who has charge of that department, is the secretary of our company, and who has a copy of this letter of mine to you."

Therefore, I have made arrangements so that material may be shipped from either the New York harbor or San Francisco, whichever is the more convenient, free of cost, to our special committee in Tokyo.

In view of the fact that this is going on Standard Oil Company ships, and that the assistant general manager of the Standard Oil Company in Japan has kindly consented to handle the funds of the New York dentists and to assist in every way in distributing the goods when they arrive there, I feel that it would be wise for both the state and national societies to combine and take advantage of this very generous offer of the Standard Oil Company and arrange to have goods shipped to San Francisco when nearest there and to New York when nearest there, and I will see that they are taken over by the shipping company and started for Japan, and your agent in San Francisco can do the same.

Sincerely yours,

HERBERT L. WHEELER,
20 East Fifty-third Street, New York.

Medical and Dental News

CONNECTICUT

Health Activities in Connecticut: In several towns, the health officer also serves as school physician and the arrangement seems worthy of consideration by those towns not large enough to require an extra person. For the medical and dental supervision of infants and school children, 29 cents per capita has been set aside in the budget, distributed as follows: $4,350 for salaries of school physician (half-time), dentist (part-time), dental hygienist, and for special medical service for prenatal, well baby and preschool conferences, $1,500 for maintenance.—American Journal of Public Health, March, 1924.

GEORGIA

Dental Equipment in Georgia: The Georgia Board of Health has a complete dental outfit which it loans for periods of three months to communities of the state in which cooperation of local dentists in its operation is properly organized.—Home, School, and Community, Atlanta, April, 1924.

INDIANA

Child-Welfare Work for Pre-School Children: The League of Women Voters of Elkhart, Ind., conducts a successful child-welfare station which this year is paying special attention to work for the pre-school child. Eight substations have been opened in school buildings or private houses in outlying districts, where once a month mothers may take their children for examination and for advice from the nurses and nutrition worker of the central station.—Bulletin of the Indiana Child-Welfare Association, Bloomington, April 15, 1924.

Activities of the Indiana State Board of Health: A series of lectures are being given to the students of the Indiana Dental College, as well as before the medical students of Indiana University and the nurses of the Robert W. Long Hospital. Many of these lectures are illustrated and educational circulars are placed in the hands of all these students. In addition, moving picture films are sent out to local meetings where local physicians and others are to address such meetings. For instance, a dentist at North Judson has put on a series of talks on public health this last winter, and has shown four or five films and a whole series of slides on various health subjects. The secretary averages from one to three written lectures every day in response to requests from physicians and others who have been asked to give a talk on some particular phase of public health work, and who write to the secretary for assistance in preparing the talk. Books are sent out from the library to men who are preparing talks.—Journal of the Indiana State Medical Association, April 15, 1924.

ILLINOIS

Nutrition Study at the University of Chicago: In connection with a class in school nutrition at Chicago University, Miss Lydia Roberts is directing the luncheons of a group of a dozen children between the ages of 2 and 5 years who are in attendance at the day nursery, housed in one of the university buildings. The purpose of the study is to determine the best methods of teaching good food habits to very young children.—Journal of Home Economics, Baltimore, April, 1924.

KANSAS

Kansas Health Car: The Kansas health car, the "Warren," has been repainted and renovated and equipped with new exhibits and health appliances for its seventh annual tour through the state. The "Warren" is an ordinary Pullman car which has been made over into a traveling health exhibit, with facili-

ties for making examinations of children. Two women members of the state board of health travel with the car.

MARYLAND

Reorganization of Maryland Dental Association: With the adoption of a new constitution and by-laws and with new papers of incorporation, the Maryland State Dental Association of Baltimore City becomes the Maryland State Dental Association. Steps toward forming an organization were first taken fifty-eight years ago, and in 1883 the association was incorporated. By this final step, all dentists in Maryland become eligible for membership. Since the adoption of the new constitution, five component dental societies have been chartered, the officers of which are as follows: Eastern Shore Dental Society: Dr. W. A. Smith, Denton, President, Dr. Charles F. Smith, Salisbury, Secretary; Frederick County Dental Society: Dr. T. S. Eader, Frederick, President, Dr. A. A. Radcliffe, Frederick, Secretary; Washington County Dental Society: Dr. L. L. Watkins, Hagerstown, President, Dr. Crown O. Diehl, Hagerstown, Secretary; The Dental Section, Tri-State Physicians: Dr. K. P. Heintz, Cumberland, Chairman, Dr. A. G. T. Twigg, Cumberland, Secretary; Baltimore City Dental Society: Dr. George E. Hardy, Baltimore, President, Dr. O. E. Culler, Baltimore, Secretary.

MICHIGAN

Study of Goiter Among Michigan Children: A study of the prevalence of goiter recently made in the city of Alma, in the center of the endemic goiter region of Michigan, is reported in Public Health. (Michigan Department of Health, Lansing) for March, 1924.

In the course of the survey, 1,805 kindergarten and public school pupils and college students of both sexes were examined. Of the 1,400 grade and high school pupils examined, 40 per cent had an enlargement of the thyroid.

NEW YORK

East Harlem Cooperative Health Center: According to a recent statement by the New York City Health commissioner, the three-year demonstration of team-work between the twenty-two public and private health and social agencies in the East Harlem Health Center has resulted in an increase of 110 per cent in the amount of service rendered by the city health department and these agencies to the 112,000 people of the district, with an increase of only 11 per cent in the cost. In the opinion of the commissioner, the experiment has shown that similar methods can be successfully used in other large cities of the country.—Journal of the American Medical Association, Chicago, April 19, 1924.

NORTH DAKOTA

Course in Nutrition University of North Dakota: A special course in nutrition open to grade school teachers will be given by the home economics department of the University of North Dakota during its summer session. The aim of the course will be to aid teachers in giving the necessary instruction in food habits to young children.—Journal of Home Economics, Baltimore, May, 1924.

TENNESSEE

University Acquires New Site: The University of Tennessee has contracted for the purchase of large tracts of ground on Dunlap and Union streets, Memphis, at a cost of more than $300,000. The dental and medical departments, now in Rogers Hall, will be transferred to these plots. Under the present program, in five years, the three schools will be able to care for 1,200 pupils.—The Journal of the American Medical Association.

VIRGINIA

The Virginia Plan for Health Education in the Public Schools: By this plan of health education, every child in the state will receive an annual physical inspection. Of 475,000 school children enrolled, 356,000 were inspected last session. The inspection, which consists of weighing and measuring the children, looking at their teeth and testing the vision and hearing, is carried out by the teacher, since it would be impossible to reach the 250,000 children enrolled in the rural districts in any other way. All normal schools in the state are presenting courses in health and physical education. These are supervised by the state board of health and state board of education, which also cooperate in conducting a correspondence course in health work for teachers. About 6,000 teachers' certificates are issued annually, and each one must show credit for this health course before being endorsed by the state board of education. By this plan, then, only those children who show defects on inspection are referred to the physician or dentist for thorough examination. As the inspection is made by the teacher, there is no ground for disagreement between the inspector and the physician to

whom the child is referred for examination. In further referring to this plan, Ira V. Hiscock, assistant professor of public health at Yale, says, in the American Journal of Public Health: "When the inspection was first begun, the appalling number of dental defects was an outstanding feature, and when the bureau in the second year of its organization received an appropriation for the school work, a dentist was employed to develop this part of the work. Little headway was made at first, but after getting the cooperation of the state dental association and demonstrating the need for the correction of dental defects to the school authorities in the rural districts, school dental clinics have become a part of the health propaganda in a large number of our counties. Last year, our state dentist had under his supervision, ten full-time dentists, and one part-time dentist. Twenty-one thousand three hundred and forty-nine children were given opportunity in these clinics to have their mouths put in order; the total number of operations was 35,156."

FOREIGN

Goiter Prevention in Switzerland: The value of iodin in the prevention and treatment of simple goiter was demonstrated by experiments conducted in a recent campaign in Switzerland. Of the 761 children who were treated at Zurich, 90 per cent were goitrous before the treatment was begun. After fifteen months, only 28 per cent of the number manifested signs of enlarged thyroid. In the St. Gall district, 3,200 children were cared for and after 18 months, 2,780, or 86 per cent, of the patients were relieved of their affliction.—Bulletin of the Save the Children Fund International Union, Geneva, April 10, 1924.

What New South Wales is Doing for Its Children: Chief among the means taken by the state government to combat the loss of infant life is the establishment of state baby clinics. The first baby clinics were opened in August, 1914, with an average attendance of 160 mothers per month. Today there are thirty-five clinics with an average attendance of 30,000 per month. The total attendance in 1922 was 137,000. To each clinic is attached a staff of two trained nurses and an honorary medical officer. Mothers are advised by nurses at the clinics, and their own homes, regarding the care and feeding of their children and themselves, and medical attention provided when necessary. Arrangements are made by the clinics for the accouchment of women at the women's hospitals, and for their free admission to rest homes in the ante- and post-natal periods. Women and children (up to the age of 5 years) suffering from dental defects are sent on to the government dental hospitals for free treatment. The maternity rest homes, maternity hospitals and the hospital for babies provided by the government for the free treatment of mothers and children have proved of great benefit to the community generally.—Child Health Magazine, April, 1924.

GENERAL

Health Instruction by Radio: The radio is being used by several important county medical societies as a means of disseminating helpful information for the public benefit. The Philadelphia County Medical Society recently announced a program for a period of three and a half months which provides for discussion each week by some member of the society of some medical subject of real interest and importance. Among the subjects announced for the first talks are "The Expectant Mother," "Diphtheria and its Prevention," and "Mental Deficiencies in Children."—American Medical Association Bulletin, Chicago, March, 1924.

Dental Research at Mellon Institute: Director E. R. Weidlein of Mellon Institute of Industrial Research of the University of Pittsburgh has announced the establishment by E. R. Squibb & Sons of New York of an industrial fellowship that has for its purpose the investigation of problems relating to the chemistry of preventive dentistry. Plans have been formulated for the study of the following problems: (1) relation between composition of saliva and dental disease; (2) effect of different diets on composition of saliva; (3) action of acids on enamel, and (4) physical and chemical properties of the tooth. The results of these investigations will be published from time to time, as the progress of the work seems to warrant. The incumbent of this industrial fellowship is Dr. C. C. Vogt, who has been a member of Mellon Institute, engaged in research on various dental problems, since 1914. He will have the benefit of the advice and clinical cooperation of Dr. H. E. Friesell, dean of the School of Dentistry of the University of Pittsburgh. The resources of dentistry and chemistry will thus be combined for the solution of important dental problems.

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Dental Association, November 10, 11, 12, 13, 14, 1924, Dallas, Texas.

American Medical Association, June 9-13, 1924, Chicago, Illinois.

American Society of Dental Radiographers, November 7 and 8, 1924, Dallas, Texas.

Canadian Dental Association, August 4-7, 1924, Vancouver, B. C.

Dental Protective Association of the United States, 4:00 p. m., December 15, 1924, Palmer House, Chicago, Illinois.

Federation of American Women Dentists, November 10-12, 1924, Dallas, Texas.

Federation Dentaire Internationale, August 6, 1924, Luxemburg.

National Association of Dental Examiners, November 10, 11, 1924, Dallas, Texas.

STATE SOCIETIES

National Capital, at Washington, D. C., first Tuesday of every month.

June

Colorado, at Glenwood Springs (19, 20, 21).
New Hampshire, at The Weirs (18, 19, 20).
New Mexico, (23-24).
North Dakota, at Grand Forks (4, 5, 6).
South Carolina, at Charleston (17-19).
Southern California, at San Diego (24, 25, 26).
Utah, at Salt Lake City (25, 26, 27, 28).
Wyoming, at Cody (17-19).

July

Wisconsin, at Milwaukee (8, 9, 10).

November

American Dental Association, at Dallas (10, 11, 12, 13, 14).
Arizona, at Phoenix.
Texas, at Dallas (10, 11, 12, 13, 14).

December

Ohio, at Columbus (4, 5, 6).

MEETINGS OF STATE BOARD OF DENTAL EXAMINERS

Alabama, at Birmingham, June 16. Secretary-Treasurer, H. Clay Hassell, 616-22d Avenue, Tuscaloosa, Alabama.

Arkansas, at Little Rock, July 3-5. Secretary, I. M. Sternberg, Merchants Bank Building, Fort Smith, Arkansas.

California, at San Francisco, June 18, and Los Angeles, July 28. Secretary, C. A. Herrick, 133 Geary Street, San Francisco, California.

Connecticut, at Hartford, June 26-28. Recorder, Arthur B. Holmes, 43 Central Avenue, Waterbury, Connecticut.

Delaware, at Wilmington, June 25-26. Secretary, W. S. P. Combs, Middletown, Delaware.

Florida, at Jacksonville, June 25. Secretary, R. P. Taylor, 414 St. James Building, Jacksonville, Florida.

Indiana, June 9 to 14. Secretary, H. C. McKittrick, 1006 I.O.O.F. Building, Indianapolis, Indiana.

Kansas, at Wichita, June 16. Secretary, George E. Burket, Kingman, Kansas.

Kentucky, at Louisville, June 3. Secretary, J. H. Baldwin, 908 Francis Building, Louisville, Kentucky.

Maine, at Augusta, June 24-26. Secretary, Henry Gilman, 192 State Street, Portland, Maine.

Maryland, at Baltimore, June 10-12. Secretary, T. L. McCarriar, 1822 N. Charles Street, Baltimore, Maryland.

Massachusetts, at Boston, June 17-25. Secretary, J. N. Carrieré, 146 State House, Boston, Massachusetts.

Michigan, June 9-14. Secretary, B. S. Sutherland, 401 Ward Building, Owosso, Michigan.

Minnesota, at Minneapolis, June 20-28. Secretary, R. B. Wilson, 1133 Lowry Bldg., St. Paul, Minnesota.

Mississippi, at Jackson, June 17. Secretary, Major Reuel May, Jackson, Mississippi.

Nevada, at Reno, June 23. Secretary, G. H. Marven, P. O. Box 56, Reno, Nevada.

New Jersey, at Trenton, June 23. Secretary, John C. Forsyth, 429 E. State St., Trenton, New Jersey.

North Carolina, at Raleigh, June 16. Secretary, F. L. Hunt, Asheville, North Carolina.

North Dakota, at Fargo, July 8. Secretary, W. E. Hocking, Devils Lake, North Dakota.

Oklahoma, at Oklahoma City, June 23-26. Secretary, L. M. Doss, 245 American National Bank Building, Oklahoma City, Oklahoma.

Pennsylvania, at Philadelphia and Pittsburgh, June 18-21. Secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia, Pennsylvania.

Rhode Island, at Providence, June 25-27. Secretary, Albert L. Midgley, 315 Butler Exchange Building, Providence, Rhode Island.

South Carolina, at Columbia, June 13-14, 1924. Secretary, W. K. Walker, Orangeburg, South Carolina.

South Dakota, at Sioux Falls, June 25. Secretary, L. R. Walston, Redfield, South Dakota.

Tennessee, at Nashville, June 16. Secretary, F. W. Meacham, Hamilton National Bank Building, Chattanooga, Tennessee.

Texas, at Dallas, June 16-19. Secretary, R. L. Rogers, Amarillo, Texas.

Vermont, at Montpelier, June 30 to July 2. Secretary, Philip E. Mellen, Middlebury, Vermont.

Virginia, at Richmond, June 10. Secretary, John P. Stiff, Fredericksburg, Virginia.

Wisconsin, at Milwaukee, June 23-28. Secretary, J. L. Blish, Fond du Lac, Wisconsin.

Wyoming, at Powell, June 23-25. Secretary, Thew J. Ice, Lock Box 116, Powell, Wyoming.

NEW MEXICO DENTAL SOCIETY

The New Mexico Dental Society will meet, June 23-24, 1924. For further information, address.

D. P. NOLTING, D.D.S., *Sec'y-Treas.*,
Albuquerque, N. M.

MISSISSIPPI BOARD OF DENTAL EXAMINERS

The Mississippi Board of Dental Examiners will hold an examination in the senate chamber of the state capitol on the third Tuesday in June.

For further information, address

MAJOR REUEL MAY, *Secretary*,
Jackson, Miss.

SOUTH CAROLINA BOARD OF DENTAL EXAMINERS

The Board of Dental Examiners of South Carolina will hold their annual meeting at the Jefferson Hotel, Columbia, S. C., June 13-14, 1924.

For further information, address

W. K. WALKER, *Secretary*,
Orangeburg, S. C.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

The next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, South Dakota, commencing promptly at 9 a. m., Wednesday, June 25.

For application blank or any information, address

L. R. WALSTON, D.D.S., *Secretary*,
Redfield, S. D.

TENNESSEE BOARD OF DENTAL EXAMINERS

The Tennessee Board of Dental Examiners will meet at 10 a. m., June 16, 1924, at the Dental Department, Vanderbilt University, Nashville, Tenn., for the purpose of examining all applicants who present credentials acceptable to the Board. Hygienists will also be examined. Applications should be in the hands of the secretary five days before the Board meeting.

For applications and clinical requirements, address

F. W. MEACHAM, *Secretary and Treasurer*,
Hamilton National Bank Bldg.,
Chattanooga, Tenn.

FEDERATION OF AMERICAN WOMEN DENTISTS

The Federation of American Women Dentists will hold their meeting in Dallas, Texas, November 10-12, 1924.

EDNA WARD, *Secretary*,
10510 Euclid Ave., Cleveland, Ohio.

THE AMERICAN SOCIETY OF DENTAL RADIOGRAPHERS

The annual meeting of the American Society of Dental Radiographers will be held at the Adolphus Hotel, Dallas, Texas, Friday and Saturday, November 7-8. All dentists interested in radiography are invited to attend.

ARNOTT A. MOORE, *President*,
131 Allen Street, Buffalo, N. Y.
MARTIN DEWEY, *Secretary*,
501 Fifth Avenue, New York City.

PROGRAM OF THE NATIONAL DENTAL ASSOCIATION OF THE PHILIPPINE ISLANDS

Held in the Library of the Philippine General Hospital, Manila, P. I., February 18-19, 1924

INAUGURAL SESSION

MONDAY, 9 A. M.

Opening Address—Dr. Fernando Calderon, Guest of Honor, Chairman of the Board of Hygiene.

Presidential Address—Dr. S. F. Tecson

SCIENTIFIC SESSION

"What the Public Welfare Board Accomplished in Dental Problems."—Dr. Hilario Perez,

"Public Welfare Root Canal Work."—Dr. Cayetano Eustaquio

"Clinico-Radiological Demonstration of Dental Pathology."—Dr. Ricardo Fernandez

"The Possibility of Replanting Teeth."—Eladio R. Aldecoa, D.D.S.

"Treatment of Pyorrhea."—Dr. Francisco Ramirez

2 P. M.

"Clinical Demonstration of Orthodontia."—Dr. Jose Lerma

"Practical Demonstration of Davis Crown Used as Dummy for Bridgework.—Dr. Gregorio Mateo

"Practical Demonstration by Other Delegates." (Names to be announced later)

TUESDAY, 9 A. M.

"The Importance of Dentistry."—Dr. Domiciano Sandoval

"The Importance of the Dental Society."—Dr. Tirso Abad

"The Common Errors in Crown and Bridgework."—Eladio R. Aldecoa, D.D.S.

"Focal Infection."—Dr. Robert N. Wright

"El Exito Professional."—Dr. Sixto de los Angeles

2 P. M

(*Stenberg General Hospital*)

"Intermaxillary Wiring; Fractures of the Mandible and Maxilla."—S. D. Boak, M.D., D.D.S., Colonel, Dental Corps, U. S. A.

"Removable Bridgework."—Roy L. Bodine, D.D.S., Captain, Dental Corps, U. S. A.

"Tinker's Bridgework."—G. C. Brown, D.D.S., Captain, Dental Corps, U. S. A.

6 P. M.

Dinner—Hotel de France

Business Meeting, presided over by Dr. Robert N. Wright, Vice-President.

EXECUTIVE COUNCIL

Dr. S. Francisco Tecson, President
Dr. Robert N. Wright, Vice-President
Dr. Eladio R. Aldecoa, Secretary-Treasurer
Dr. Domiciano J. Sandoval
Dr. Tirso Abad

RESOLUTION ADOPTED BY THE ACADEMY OF STOMATOLOGY*

WHEREAS, By untrue and unfair advertising, certain proprietary preparations are being sold to the public by druggists and general store keepers as harmless cleansers of teeth, teeth bleaches, stain removers, tartar solvents and teeth whiteners,

WHEREAS, Such certain proprietary preparations work injury to the enamel of the teeth, causing disintegration, and are, therefore, destructive to the teeth and subversive to the general health, be it

Resolved, That this society hereby authorizes, empowers and instructs the president to appoint a committee to present information to the Commissioner of Health of the State of Pennsylvania and to the Director of Public Health of the City of Philadelphia, with requests that any and all teeth bleaches and teeth stain removers so sold and advertised to the public as harmless be investigated by the proper health officers of this State, and be it further

Resolved, That a copy of this resolution be forwarded to the Commissioner of Health of the State of Pennsylvania, the Director of Public Health of the City of Philadelphia, the president of the Pennsylvania State Dental Society, the president of the American Dental Society, the Board of Examiners of the State of Pennsylvania, the presidents of the various dental societies in the State of Pennsylvania, the Pure Food and Drug Section of the Department of Agriculture of Washington, D. C., the Postmaster General and all reputable dental journals.

SERVICE FOR THE PROFESSIONAL AND SCIENTIFIC INSTRUMENTS TRADE

The Commercial Intelligence Division of the Department of Commerce has just announced the compilation of trade lists of interest to the professional and scientific instruments trade. These lists contain the names of importers and dealers in professional and scientific instruments in foreign countries with pertinent information as to size and relative importance of the firms in their respective commodities.

In addition to the periodic compilation of trade lists, the division has on file definite and complete sales data on dealers in professional and scientific instruments in all parts of the world, which is kept complete by reports from more than 1,000 American trade representatives stationed abroad.

This information is available to all American

*Similar resolutions have been adopted by various organizations.

firms and individuals and the professional and scientific instruments trade are especially invited to avail themselves of the service of this division.

The Trade Lists which may be had without charge from any district or cooperative office of the Bureau of Foreign and Domestic Commerce, or from its office in Washington by giving title and file number, follow:

PROFESSIONAL AND SCIENTIFIC INSTRUMENTS

IMPORTERS AND DEALERS

Australia	FE—23051
Belgium	EUR—1039
Bolivia	LA—11031
British Malaysia	FE—18027
Canada	BE—1045
Columbia	LA—14034
Cuba	LA—31046
Denmark	EUR—2042
England	BE—2046
Finland	RD—60053
Japan	FE—11054
Latvia	RD—80014
Mexico	LA—30090
New Zealand	FE—24035
Paraguay	LA—19018
Peru	LA—20039
Salvador	LA—29020
Sweden	EUR—12043
Uruguay	LA—21026
Venezuela	LA—22025

HOSPITALS

Ceylon	FE—22018—A (revision)
Ecuador	LA—15006—A (revision)

UNIVERSITY OF TENNESSEE COLLEGE OF DENTISTRY

At a recent meeting of the Dental Educational Council of America, the University of Tennessee College of Dentistry was placed in Class A.

ALBERT L. MIDGLEY, *Secretary,*
Dental Educational Council of America.

NEW BOOKS RECEIVED FOR THE LIBRARY OF THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

The Journal of the American Dental Association promptly acknowledges herewith the receipt of new publications. Books selected from those named on this list are reviewed below. Reviews are matter-of-fact statements of the nature and contents of the publication referred to and are intended *solely to guide possible purchasers.*

"The Essentials of Physiology, Including Pharmacodynamics." George Bachman, M.S., M.D., Professor of Physiology in the School of Medicine of Emory University; Sometime Demonstrator of Physiology in the Jefferson Medical College of Philadelphia; and A. Richard Bliss, Jr., A.M., Phm.D., M.D., Professor of Pharmacology and Physiology, University of Tennessee. Philadelphia: P. Blakiston's Son & Co. Price, cloth, $3.50. 343 pages with 178 illustrations.

This volume purposes to fulfil the demand for a physiologic textbook suited to the needs of dentistry students, "a demand made more urgent by the remarkable progress of medicine and of professional dentistry; by the rapid rise in standards of instruction, and by the further advances already scheduled for the near future" Each chapter is accompanied by a presentation of the pharmacodynamics of the drugs of major importance related to the function just discussed. The broad principles only of pharmacodynamics are presented with but slight reference to therapeutic applications.

"Treatment of Common Disorders of Digestion." A handbook for Physicians and Students. John L. Kantor, Ph.D., M.D., Chief in Gastrointestinal Diseases, Vanderbilt Clinic, Columbia University; Associate Gastroenterologist and Associate Roentgenologist, Montefiore Hospital for Chronic Diseases, New York City. St. Louis: The C. V. Mosby Company, 1924. Price $4.75. Pp. 245.

This handbook is intended to serve as a guide in the treatment of those forms of digestive disorders most commonly met with in the practice of medicine. The diet lists presented are with some exceptions based on those in use at the Vanderbilt Clinic.

Principles and Practice of Crown and Bridgework. Hart J. Goslee, B.S., D.D.S., F.A.C.D., Chicago, Illinois. Brooklyn: Dental Items of Interest Publishing Co., 1923. Fifth edition. Pp. 478.

According to the foreword, this work is offered to teachers, practitioners and students of dentistry as a practical text and reference book. This fifth edition is intended to replace the previous editions and is demanded by "the wonderful advancements made in all branches of dentistry, and the splendid improvements made in the specialty of crown and bridgework, in particular, during the past few years."

DEATH OF MR. JAMES D. LOCHHEAD

Notice has been received of the death of Mr. James D. Lochhead as follows:

"It is with deepest regret that we beg to announce the death of our beloved president and founder, Mr. James D. Lochhead."

THE LOCHHEAD LABORATORIES, INC.
New York, Boston, Chicago and Los Angeles

SLIDES FOR MOTION PICTURE HOUSES

In many communities, dentists have interested local motion picture managers in showing a slide or two with pithy dental slogans between films. As many other dentists would probably be interested in so doing, the American Dental Association offers the following list of slides from which five may be selected for $1.75. Orders may be sent to the American Dental Association, Education Department, 5 North Wabash Avenue, Chicago, Illinois.

1. Prompt attention to decayed teeth saves money and time.

2. Do you visit a dentist twice a year or do you wait until your teeth drive you to him?

3. The grinding power of sound natural teeth is about 350 pounds; of artificial teeth about 25 pounds. Why don't you save your teeth?

4. Decaying teeth spell dyspepsia. Diseased teeth and unclean mouths are the most frequent cause of indigestion. Chew your food well. The stomach has no teeth.

5. Watch your teeth. (Sketch of lighthouse).

6. "Proper care of the mouth and teeth is one of the most important of all the measures that are taken for the protection of the human body, and a failure to give them care, is, in my judgment, the direct cause of more disease in the human family than any other single cause."
MAJOR W. W. OWEN, M.D., *Surgeon, U. S. Army.*

7. From a health standpoint, it is more important to brush the teeth after each meal than to wash the face on rising.

8. If you have bad teeth and cannot chew your food properly, indigestion results and your health suffers.

9. Arthritis, heart trouble, rheumatism are prominent symptoms of bad mouth conditions. There is prompt relief in correct dentistry.

10. You need never lose a tooth.

11. Decaying teeth do not permit of perfect mastication; imperfect mastication is the open door to malnutrition, and malnutrition is one of the greatest factors in all diseases. Clean teeth do not decay.

12. Pyorrhea is the cause of the loss of more than 50 per cent of all the permanent teeth that are lost from any cause. The slow insidious nature of the disease results in its presence usually not being suspected until considerable irreparable damage has been done and often not until many teeth are practically lost. Pyorrhea can be prevented by keeping the teeth clean and it can be cured if not in an advanced stage.

13. There are ten million school children in the United States suffering from the direct effect of decaying teeth and insanitary mouths. Is your child among them?

14. Neglect of the temporary teeth means crooked and rapidly decaying permanent teeth. Sound teeth properly used will result in good health. You save money; today's small filling saves tomorrow's large filling. How about your child?

15. As a result of bad teeth and insanitary mouths, the physical development of the child is seriously retarded. The more the physical development is disturbed, the less in general, is the mental capacity. The worse the teeth, the worse, as a rule, is the school standing.

16. "On account of bad teeth, the physical development of the child is seriously retarded."
"The more the physical development is disturbed. the less, in general, is the mental capacity of the child."
"The worse the teeth, the worse, as a rule, is the school standing." —JESSEN.

17. A child cannot obtain a high standard of scholarship if his mind is disturbed by aching teeth.

18. Forty per cent of the absences from school are caused by toothache. It has been shown that children with decaying teeth are six months longer in completing the eight common school grades, than are children with clean mouths and sound teeth. Wouldn't it pay to take care of the children's teeth?

19. The experience of school dental clinics has demonstrated their necessity. In no branch of public hygiene are such decisive results obtained and with such relatively small costs.

20. There is no doubt that the development of tuberculosis is favored to a large extent by a bad condition of the teeth.

21. "A well conducted school dental clinic is the best and most effective institution for the prevention of tuberculosis." —JESSEN.

Casting for Good Will

By ERNEST V. MADISON

Whenever a manufacturing or jobbing business is sold, you will find *good will* included in the inventory.

Good will is a total of the *prestige, affection, publicity, confidence and satisfaction* that the firm has developed among the buying public or profession.

Often it constitutes the largest item of value, although it is an invisible asset. It is because of the worth of *good will* that manufacturers frequently take extreme action to prevent a dissolving of the firm name when one or more of the original founders retire from business.

Good Advertisements are Developers of Good Will

Experienced advertisers keep their names before their field that they may be known; that they may develop prestige; that when the time comes for a purchase, the buyer may be favorably inclined toward their firm because of the feeling of acquaintance and reliability that has been subconsciously developed through their advertising.

And right here comes one of the main reasons why you should read the advertisements in *The Journal of the American Dental Association* and give preference to the products advertised in them. *The very fact that the articles are advertised is a protection for you.*

In order to develop confidence and satisfaction, which are important elements in *good will,* the advertiser must give a sufficient value to satisfy you in every particular—which will make you a repeat customer, buying his goods whenever the need arises.

Buy goods advertised in *The Journal of the American Dental Association* for the advertisers are seeking your good will and cannot afford to slight design, workmanship or material for the sake of an increased immediate profit.